# Exhibit 5

# PLAINTIFFS' RESPONSE TO DEFENDANTS' MOTION TO EXCLUDE GENERAL CAUSATION TESTIMONY OF PLAINTIFFS' EXPERTS

SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF LOS ANGELES

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| COORDINATION PROCEEDING SPECIAL TITLE [RULE 3.400] SOCIAL MEDIA CASES | JUDICIAL COUNCIL COORDINATION PROCEEDING NO. 5255 |
| THIS DOCUMENT RELATES TO: Cristina Arlington Smith, et al., v. TikTok Inc., et al., Case No. 22STCV21355 | For Filing Purposes: 22STCV21355 Judge: Hon. Carolyn B. Kuhl SSC-12 |

Wednesday, June 4, 2025
CONFIDENTIAL - PURSUANT TO PROTECTIVE ORDER

Video-Recorded Oral Deposition of RAMIN MOJTABAI, MD, PhD, MPH held at the offices of Irwin Fritchie Urquhart Moore & Daniels LLC, 400 Poydras Street, Suite 2700, New Orleans, Louisiana, commencing at 9:05 a.m. CDT on the above date, before Michael E. Miller, Fellow of the Academy of Professional Reporters, Certified Court Reporter, Registered Diplomate Reporter, and Louisiana Certified Court Reporter #27009.

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VIDEOGRAPHER:
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GOLKOW - VERITEXT

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P R O C E E D I N G S

June 4, 2025, 9:05 a.m. CDT

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THE VIDEOGRAPHER: We're now on the record. My name is David Nunn. I'm a videographer for Golkow Litigation, a Veritext division. Today's date is June 4th, 2025, and the time is 9:05 a.m. This is the beginning of Media 1.

This video deposition is being held in New Orleans, Louisiana, in the matter of Social Media Adolescent Addiction before the Superior Court of the State of California for the County of Los Angeles.

The deponent is Dr. Ramin Mojtabai.

Counsel will be noted on the stenographic record. The court reporter is Mike Miller, and will now swear in the witness.

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RAMIN MOJTABAI, MD, PhD, MPH, having been duly sworn, testified as follows:

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EXAMINATION

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BY MR. DAVIS:

Q. Good morning, Dr. Mojtabai. My name is Todd Davis. How are you doing?

A. Good, thank you.

Q. We met briefly before the start of the deposition, right?

A. Yes.

Q. Now, you understand that you have been identified by plaintiffs' counsel as an expert who will offer opinions at the trial of this case, right?

A. Yes.

Q. And you understand that the defendants are here today to find out the bases for your opinions and what your opinions are, right?

A. Correct.

Q. Okay. Now, if you don't

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understand one of my questions, will you please let me know?
A. I will.
Q. If you answer my question, I will assume that you heard it, you understood it, and you answered the question that I asked.
Is that acceptable to you?
A. It is.
Q. Now, are you on any medication or have any type of medical condition that would prevent you from testifying truthfully and accurately today?
A. No.
Q. You're doing a great job so far in terms of waiting for me to finish my question before you start your answer, and also, not shaking your head or nodding. So I would just ask you to keep that up because you're doing a great job, all right?
A. Will do.
Q. Great.
Now, if at any time you need a break, I would just ask that if there's a question pending, that you answer my question

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that's pending before we have a break.
Is that acceptable to you?
A. It is.
Q. Great.
Now, I want to have a couple definitions, if you will, so that we can understand that we're on the same page about a couple of issues, okay?
A. Okay.
Q. When I'm referring to a social media platform, I'm referring and including the app that is downloaded on people's phones for that platform. And when I'm talking about the app, I'm also including the social media platform.
Is that acceptable to you?
A. It is.
Q. And when I use "psychiatric disorders" and "mental health disorders," I mean the same thing.
Is that acceptable to you?
A. Yes.
Q. And when I reference psychiatric disorders, I mean any depressive disorder, any anxiety-related disorder, any

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eating disorder and body dysmorphic disorder.
Is that acceptable to you?
A. I have a question.
Q. Yes, sir.
A. When you say any disorder, what do you mean?
Q. Well, when I'm talking -- you understand that there are disorders, anxiety-related disorders --
A. Correct.
Q. -- such as general anxiety disorder, posttraumatic stress disorder, social anxiety disorder, right? Those are anxiety-related disorders, right?
A. Correct.
Q. And I'm also -- there's also a number of other anxiety disorders that are identified in the Diagnostic and Statistical Manual or DSM, right?
A. Correct.
Q. Okay. So I'm trying to capture all of them, okay? So let me ask my question again.
When I reference psychiatric disorders, I mean any depressive disorder,

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anxiety-related disorder, eating disorder and body dysmorphic disorder.
Is that acceptable to you?
A. It is.
Q. Thank you.
Now --
MS. EMMEL: I'm likely going to object to those, when we get to them, as being vague. So maybe if you could specify at the time you ask, that would be helpful.
BY MR. DAVIS:
Q. I'm going to go ahead and also ask you, if I use the term "randomized controlled trial" or RCT, that we're talking about the same thing.
Is that acceptable to you?
A. It is.
Q. Okay. And if I use the term "experimental study," I'm also including that to mean an RCT.
Is that acceptable to you?
A. It is.
Q. Okay. All right. Let me go ahead and mark as Exhibit 1 the notice for

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your deposition.
(Whereupon, Mojtabai-1, Defendants' Joint Notice of Deposition of Plaintiff's Retained Expert Ramin Mojtabai and Request for Production of Documents, was marked for identification.)
BY MR. DAVIS:
Q. Here, let me go ahead and hand you Exhibit 1, Dr. Mojtabai.
Now, did you have an opportunity in advance of the deposition to look through this deposition notice and the document requests that are included in it?
A. Yes.
Q. Now, did you bring any materials with you to the deposition?
A. I didn't, but my attorneys, I think.
Q. Counsel for plaintiff --
A. Yes.
Q. -- collected some materials and brought it to the deposition?
A. Correct.
Q. Okay. Let's talk about what

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you brought to the deposition, all right.
I see to your left you have a black-and-white notebook, right?
A. Correct.
Q. Okay. And what's in the black-and-white notebook?
A. The black notebook includes my report, Exhibits A to E, and I believe one of them is my CV.
Q. All right. Thank you.
And what's underneath the black notebook?
A. These are exhibits from different people who have had depositions in the matter.
Q. Okay. So when you say depositions in the matter, you're talking about company depositions?
A. Correct.
Q. Okay. And when did you first read through that deposition notebook?
A. I didn't read it in a notebook format, but online. I don't recall when exactly it became available to me and I had a chance to read them. But I think my

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invoices, that you guys should have it, notices when I had a chance to review these documents.
Q. So were the materials -- the deposition exhibits or internal company documents, are those something that you had read before your April 18, 2025 report?
A. I believe so. There are a lot of depositions here, so I can't be sure. But I believe the names are familiar.
Q. All right. Do you have any handwriting or notes on either the materials in the white notebook that has the company deposition and documents, or the black notebook that contains your report?
A. With me, you mean?
Q. On them, actually what you brought.
A. No.
Q. Okay. You also brought, I think, a folder as well that's in that stack of material?
A. You mean this one?
Q. Yes, sir.
A. Yes.

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Q. Okay. What's in the folder?
THE WITNESS: Is it --
MS. EMMEL: Yes, that's yours.
A. Materials Considered After May Report.
BY MR. DAVIS:
Q. Okay. And when you say after May report, what May report are you referring to?
A. My report on social media and mental health.
Q. Okay.
A. The one that is contained in this folder.
Q. Okay. Well, that one, I think, and your black notebook that you just referred to, that's dated April 18, 2025, right?
A. I believe it was updated. There were some minor errors, corrections that I made. That's my understanding.
Q. Okay. So when -- do you understand that there's two separate litigations that are going on? There's a state court --

A. And a federal.
Q. -- and a federal, right?
A. Yes.
Q. Okay. And you understand, here today, we're talking about your report in the state court proceeding, right?
A. I understand, but I'm not sure which one of these -- whether the updated report was given to you guys or the original one.
Q. Okay. Let me ask you about -- on the folder.
A. Uh-huh.
Q. What's the title of the folder?
A. The title, Materials Considered After May Report.
Q. Okay. So the materials that you have -- there's a document that's in the folder entitled Materials Considered After May Report, right?
A. Correct.
Q. And that document has some highlighting on it, right?
A. Correct.
Q. Okay. And are the highlights



the one -- the documents that you considered after your May 2025 report?
A. There are a lot of them, but I can recognize some of them are papers that I found later and added. So, for example, Nagata. I can't be sure about the other ones, because they were all, you know, a mix in my head.
Q. Let me ask you this way.
What's the significance of the highlighting in the document?
A. I believe they were added or considered after the report was finalized.
Q. Okay. Considered by you?
A. Yes.
Q. Okay. Let me go ahead and I'm going to mark that as Exhibit 2.
(Whereupon, Mojtabai-2, Materials Considered, MOJTABAI0087 - MOJTABAI0172, was marked for identification.)
MR. DAVIS: Tell you what -- yeah. Okay.
THE WITNESS: Okay.
///



BY MR. DAVIS:
Q. And we'll put the folder itself, we'll mark that as Exhibit 3, okay?
(Whereupon, Mojtabai-3, Folder Containing Exhibit 2, Materials Considered, was marked for identification.)
A. Okay.
BY MR. DAVIS:
Q. And then you also have with you a box of material that's sitting behind you, right?
A. Correct.
Q. Those are studies that you've cited in your expert report from April of 2025?
A. Cited, and I believe some of them are these studies that I considered after the report was completed.
Q. In terms of any of the studies that you considered after your April 2025 report --
A. Right.
Q. -- have you written up any document that summarizes or sets out your



opinions about those studies?
A. I haven't.
Q. Okay. And --
MS. EMMEL: Counsel, for the record, I would like to state that he adopted, in his May 16th rebuttal, that -- it was not a rebuttal, it was just an announcement that he adopted his MDL report as an updated version of his JCCP report.
MR. DAVIS: I'm not sure that I know what that means, but let me just ask my next question.
BY MR. DAVIS:
Q. Dr. Mojtabai, did you understand that in terms of the state court litigation, you had an opportunity to write up a rebuttal report for that litigation?
A. I didn't know that I had an opportunity to write a rebuttal report.
Q. Okay.
A. Rebuttal to what, I'm not sure.
Q. Okay. You did look at -- and I can hand you your invoices if you need to see them.

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Let's do it this way. Let me mark as Exhibit 4 a copy of the invoices that we received last night from plaintiffs' counsel.

(Whereupon, Mojtabai-4, Invoices, MOJTABAI0173 - MOJTABAI0176, was marked for identification.)

BY MR. DAVIS:

Q. Do you see that's what Exhibit 4 is?

A. I do.

Q. Okay. And if you turn to page -- the last page, you see that there are references in -- in your invoice for April of 2025, that talk about different defense expert reports that you've reviewed and analyzed in April, right?

A. Dr. Platt's report, yes, drafting. Dr. Patten's report, Dr. Gibbons' report, yes.

Q. Right. And so you had an opportunity in April --

A. Right.

Q. -- to look at defense expert reports, correct?

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A. I did.

Q. And after reviewing any defense expert report, did you ever put together what's called a rebuttal report that counters the opinions that were set out in the defense expert reports?

MS. EMMEL: Objection. This is getting into legal conclusions.

It has been represented to defendants that his May 16th report was a supplemental report to his JCCP report in April.

MR. DAVIS: Okay.

BY MR. DAVIS:

Q. Dr. Mojtabai, after reviewing any defense expert reports, did you ever put together what's called a rebuttal report or any type of report that counters the opinions that were set out in the defense expert reports?

A. I was asked to look at these. They were not rebuttal of my report specifically. They mentioned sometimes my report. But I had a chance to look at these reports and put down -- drafted a very --

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MS. EMMEL: Don't get into attorney work product or anything that is privileged.

BY MR. DAVIS:

Q. Okay. Let me -- are you finished with your answer?

A. Yeah.

Q. Okay. Let's -- after looking at the defense expert reports in the JCCP litigation --

A. Uh-huh.

Q. -- did you ever put together a report that discussed your opinions about the defense expert reports?

A. I did.

Q. I'm sorry?

A. I did.

Q. You did?

MS. EMMEL: Again, this is -- this is not work product that you're discussing. It is anything that was submitted that he's referring to.

Do not discuss work product.

THE WITNESS: Okay.

///

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BY MR. DAVIS:

Q. Okay. So without asking you about the substance, you did -- you did prepare a report to address some of the issues that are issues that had been raised by defense expert reports, right?

MS. EMMEL: I object to that based on I think you're getting into work product and, I mean, perhaps if you could rephrase it to have you submitted a report?

MR. DAVIS: My question stands.

BY MR. DAVIS:

Q. Dr. Mojtabai, did you prepare a report that addressed issues raised by the defense experts?

A. Some of the issues.

MS. EMMEL: Again, do not -- do not discuss work product.

THE WITNESS: Okay.

MS. EMMEL: It's only reports that were submitted as a rebuttal report.

BY MR. DAVIS:

Q. Do you know whether or not that

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report was ever provided to the defendants?
MS. EMMEL: Objection, mischaracterizes testimony.
A. I don't know.
BY MR. DAVIS:
Q. You don't know.
Did you provide it to counsel?
MS. EMMEL: Objection. Do not discuss work product. Don't answer the question.
THE WITNESS: Yes.
BY MR. DAVIS:
Q. You're going to follow counsel's advice?
MS. EMMEL: Do not answer the question.
MR. DAVIS: I'm not asking him to answer the question. I'm asking if he's going to follow your advice not to answer the question.
MS. EMMEL: I objected to that as work product.
MR. DAVIS: Dr. Mojtabai, are you going to follow counsel's instructions? And it's okay. I'm not

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going to have a fight with you about it if you do, but are you going to follow counsel's instructions and not answer the question about whether or not you're going to follow counsel's instructions?
MS. EMMEL: I'm instructing you not to answer the question.
BY MR. DAVIS:
Q. And you're going to follow that advice, Dr. Mojtabai?
A. I'm following her advice, yes.
Q. Okay. Thank you. All right.
So let's talk about your invoices, okay?
A. Okay.
Q. My calculation is that you've spent 780 -- excuse me, 287 hours of time as reflected in those invoices.
Does that sound about right to you?
A. The last one doesn't have the total hours. Oh, yeah, it does. 119, 118.
What was the number? Can you repeat, please?

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Q. Sure, absolutely.
My question is: I added up your hours that you spent, and I come up with 287 hours that you've spent that's reflected in the invoices.
Does that sound about right to you?
A. Yeah, sounds right.
Q. And I also have that your fees were from basically -- your invoices are dated from November 8, 2024 to June 1, 2025, and they total $143,000, about.
Does that sound about right?
A. How much was it? I'm sorry.
Q. 143,000?
A. Sounds right.
Q. Okay. Now, if you look at the first page of the invoice -- of the exhibit of invoices, you see that the first date is June 6th, 2024, right?
A. Correct.
Q. Now, was that the first time that you had any contact with plaintiffs' counsel about serving as an expert in this litigation?

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A. In this litigation, yes.
Q. Okay. For the time that's reflected on these invoices, does that include time as well for the federal MDL proceeding or is it just this state court proceeding?
A. Well, in my mind -- and the report is -- it was the same.
Q. Okay. So it's a combination of your time between the two litigations?
A. Correct.
Q. Okay. Now, you mentioned that -- well, do you know how plaintiff -- well, let me start again.
How did plaintiffs' counsel reach out to you to ask about whether or not you'd be interested in serving as an expert in this case?
A. I had been involved in prior litigations related to social media.
Q. Which litigations are those?
A. Some, I believe, litigations involving TikTok and Meta, to my best recall.
Q. Were those litigations in Canada?

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A. Yeah.
Q. All right. And so any -- besides those two litigations in Canada, have you had any other involvement in social media litigation?
A. I don't recall, but this is going back to 2022, and so don't have good memory of that.
Q. And you've actually submitted an affidavit in both Canadian litigations, right?
A. I believe there was -- again, in my mind, they were the same, so I recall actually submitting an affidavit, but whether it was separate or just one, I'm not exactly sure.
Q. But regardless, it was for the Canadian litigation?
A. Yeah.
Q. One of them, at least, right?
A. Yes.
Q. Okay. And when were you first retained as an expert in either of the Canadian lawsuits?
A. Again, my memory is not very

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clear, but could be '22-23.
Q. Okay. Is that your best estimate of the time?
A. Yeah.
Q. Now, have you given any deposition or trial testimony in any --
A. No.
Q. -- litigation other than this one?
A. No.
Q. Okay. So let's go back to the first reach-out for the Canadian litigation.
Who reached out to you?
A. I believe it was the counsel, Tony Leoni. I remember his name. I don't recall the name of the firm or the firms, if there were multiple.
Q. Was it a Canadian lawyer?
A. I believe so.
Q. And you agreed to serve as an expert witness in the Canadian litigation against social media companies?
A. I was asked to prepare a report, an affidavit.
Q. And you did that?

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A. Yes.
Q. Okay. Now, do your invoices at all that you've identified for this -- that have been produced to us for this deposition, do they include any time that you spent on the Canadian litigation?
A. No. That Canadian litigation was -- ended before -- from my understanding, before this.
Q. How many hours -- what's your estimate of hours that you've spent on either of the two Canadian litigations?
MS. EMMEL: Objection, beyond the scope of this deposition.
A. It should be something comparable to this.
BY MR. DAVIS:
Q. So something in the order of about a hundred and -- $143,000 and then about 280 hours?
MS. EMMEL: Objection, beyond the scope of this deposition.
A. I'm not sure about the dollar amount or the hours, exactly. But it was on -- in terms of length of time that I was

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involved in preparing the report, might have been similar, except -- yeah, except I had more material for this deposition.
BY MR. DAVIS:
Q. All right. So something -- the Canadian litigation time and the charges for that were something comparable to what you did for this -- for the US litigation?
MS. EMMEL: Objection, beyond the scope of the deposition.
A. I believe it was -- my memory is not exactly good about that, but it's possible.
BY MR. DAVIS:
Q. All right. Let me hand you what I'm going to mark as Exhibit 5.
(Whereupon, Mojtabai-5, 4/18/25 Mojtabai Expert Report, was marked for identification.)
BY MR. DAVIS:
Q. Do you see, Dr. Mojtabai, that this is a copy of your April 18, 2025 expert report in the JCCP litigation?
A. Yes.
Q. Okay. And if you look at -- if

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you look at the very first page of the report, you say: I have been retained by counsel to prepare an expert report on what relationship there is, if any, between social media use and adverse mental health outcomes in adolescents and youth.

Do you see that?

A. Yes.

Q. Okay. Is that the charge that you were given by plaintiffs' counsel in this case?

A. Yes.

Q. Okay. Now, your time -- you charge at -- let me back up. Sorry.

Your time is $500 per hour for everything except deposition and trial testimony, right?

A. Correct.

Q. And for deposition and trial testimony, you charge a thousand dollars an hour, right?

A. Correct.

Q. Now -- and when you -- let's say if you're preparing for a deposition or for trial testimony, do you -- what do you

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charge?

A. We honestly haven't even thought about it, but it's probably the $500 that I charge.

Q. Okay. And so in terms of the time like when you start allocating for your time, like, for example, when you left your house this morning --

A. Yes.

Q. -- right, and you came and -- came to the deposition, do you kind of keep track of that so you put that into the charge?

MS. EMMEL: Objection, vague.

A. To be honest with you, again, I haven't considered that, like, time and transportation or commuting as keeping track of it. I haven't considered that.

BY MR. DAVIS:

Q. Okay. So let me just ask it an easier way.

Do you charge for travel time?

A. Can I qualify that answer? This -- preparing these and meeting with counsel did not involve travel. Most of the

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meetings were via Zoom.

Q. Sure.

A. So it's not something I have considered.

Q. So, for example, if you travel from New Orleans to California to testify in the trial of the case, are you going to charge for your travel time?

A. Now that you mention it, yes.

Q. Okay. And what's the charge going to be?

A. It's going to be --

MS. EMMEL: Objection, speculation.

THE WITNESS: Yeah.

A. I haven't considered, but it could be exactly $500 per hour.

BY MR. DAVIS:

Q. Okay. Other than the time that's reflected on the invoices that have been marked as an exhibit --

A. Right.

Q. -- is there any additional time that you have incurred in connection with social media litigation?

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A. Can you specify --

Q. Sure.

A. -- what do you mean by time that I have incurred?

Q. Sure.

If you look at the last time entry on the last page, it's May 30 --

A. Yes.

Q. -- 2025, right?

A. Correct.

Q. Okay. Since May 30, 2025, have you spent any additional time on this matter?

A. Yeah, June 1st and June 2nd, and then I had meeting with the counsel in person also yesterday. So yeah.

Q. And was the June -- were the June 1 and June -- other than June 1 and June 2, did you have any other meetings with counsel?

A. And I mentioned yesterday, which was June 3rd.

Q. Okay. Other than those three dates, any other meeting?

A. I have to make a correction.

I didn't meet with counsel on

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June 1st or 2nd. I just worked on the...
Q. I'm sorry, I couldn't hear you.
A. I prepared for the deposition.
Q. Okay.
A. I did not meet. But yesterday I did meet with counsel.
Q. Thank you for that clarification.
A. Sure.
Q. So June 1 and June 2, you spent time preparing for the deposition by yourself?
A. Correct, correct.
Q. How much time on each day?
A. I would say six, seven hours a day.
Q. Okay. And then for June 3, what amount of time did you spend preparing for the deposition?
A. June -- yesterday?
Q. Yes, sir.
A. Well, we met from 9:00 until 1:00, so it's about four hours.
Q. That was in person or by remote?

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A. The last one was in person.
Q. Okay. Had there been other times that you have met, either in person or remotely, with counsel to prepare for the deposition?
A. No. In person, no, but on Zoom, yes.
Q. Okay. How many times, before June 3, did you meet with counsel to prepare for the deposition?
A. You mean on Zoom?
Q. On Zoom, yeah.
A. I can count those, actually. I have charged for those. One, two, three... I see 12 --
Q. Okay.
A. -- occasions.
Q. All right. Do you have any additional work planned?
MS. EMMEL: Objection, speculation.
A. Not work planned, not that I'm aware of.
BY MR. DAVIS:
Q. Okay. Now, have you ever

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been -- I'm going to switch gears a little bit on you, all right.
Have you ever been a defendant or a plaintiff in any lawsuit?
A. No.
Q. Now, I'm going to switch gears again and get a little bit more information about your background, all right?
A. Okay, sure.
Q. Now, you did your medical training and obtained your medical degree in Iran, right?
A. Correct.
Q. And have you obtained a medical degree in the US?
A. No, but I have ECFMG certification, which testifies to the equivalence of my medical degree to American degrees.
Q. So you went through a process here in the US to allow you to practice medicine, right?
A. Correct.
Q. And you -- and does that -- that process involves meeting certain

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requirements, right?
A. Correct.
Q. Does it also require taking an exam?
A. Yes.
Q. And how many times did you take the exam?
A. I believe four times; this USMLE has four sections, so USMLE 1, USMLE 2, which has two sections also, and USMLE 3. So overall, three parts of the USMLE.
Q. Okay. Did you pass any of the sections of the exam every time you took it?
A. I did.
Q. Now, you are board certified in psychiatry, right?
A. Correct.
Q. Do you have board certification in any other area?
A. No.
Q. How many times have you sat for your board certification exam?
A. Once.
Q. And you received a master's in public health in 2002, right?

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A. Correct.
Q. Was that a one-year program?
A. One and a half year or two years. I don't recall exactly.
Q. Other than your master's in public health, have you undertaken any additional coursework in either epidemiology or biostatistics?
A. During my PhD in clinical psychology, I took courses in biostats.
Q. How about epidemiology?
A. Not epidemiology.
Q. Do you hold any degrees in epidemiology or statistics?
A. No.
Q. Have you ever attempted to obtain either of those degrees?
A. I have not.
Q. Have you ever done a residency or a fellowship in either epidemiology or biostatistics?
A. No.
Q. Now, there are certifications that epidemiologists can receive, right?
A. There is a -- to get a PhD

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usually in epidemiology, PhD is usually in the School of Multiple Health, and they get their PhD in the Department of Epidemiology. Some schools have biostats and epidemiology combined.
Q. Do you have a PhD in epidemiology?
A. I don't.
Q. Do you have a PhD in statistics or biostatistics?
A. I do not.
Q. There's something that's called a certification test where someone who specializes in epidemiology can take.
Are you familiar with that?
A. I've heard of something like that. It's not a requirement for people who are working in biostats or epidemiology, but I've heard that they have something like that.
Q. Have you ever tried to obtain any kind of certification like that?
A. No.
Q. Now, I noticed in your report and in your CV, you don't describe yourself

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as an epidemiologist; is that fair?
A. I have to qualify that. My work has, over the past 20-some years, been in the area of psychiatric epidemiology and mental health services. So does it qualify for what you're asking, whether or not, I'm not sure.
Q. Okay. Let me ask it a different way.
A. Okay.
Q. When you stand up in front of your peers and you introduce yourself --
A. Yes.
Q. -- do you describe yourself as an epidemiologist to other researchers, doctors or scientists?
MS. EMMEL: Objection, vague.
A. I do not identify myself as an epidemiologist or biostatistician.
BY MR. DAVIS:
Q. Okay. Now, other than the Riehm, R-I-E-H-M, 2019 study that you were a coauthor on --
A. Yes.
Q. -- have you ever designed or

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conducted a longitudinal or experimental study about social media?
A. No.
Q. Have you ever designed or conducted a longitudinal study that's either lagged or cross-lagged?
A. Can you specify what you mean by designed a study? Because a study could be analysis of data.
Q. Yeah. I'm looking for where you had input into how the study was put together, how -- what the methodology was for collecting data, how it was going to be analyzed and assessed.
MS. EMMEL: Objection, compound.
BY MR. DAVIS:
Q. So with that in mind, have you ever designed or conducted a longitudinal study that was either lagged or cross-lagged?
MS. EMMEL: Objection, compound.
A. I mean, cross-lagged and -- I have been involved in designing longitudinal studies if that qualifies, longitudinal

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studies with multiple waves. So that could be analyzed as a cross-lagged analysis.

So that's why I was asking: Are you talking about -- what do you mean exactly by designing?

Q. Yeah. And I won't spend much more time on this, but it really is where the design of the longitudinal study actually did a lagged or cross-lagged analysis and you had involvement in the design, construction and interpretation as a researcher, study researcher, into that longitudinal study.

MS. EMMEL: Objection, compound.

A. Again, I have to qualify: Longitudinal data can be analyzed as cross-lagged, or random intercept cross-lagged.

So it's not something inherent in the design of the study that it's going to be analyzed as a cross-lagged.

You could analyze a longitudinal study as a longitudinal study without considering the lagging. You could include that lags, which means that you're

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including the other regressive terms into the analysis.

So it's a matter of analysis. There is design of the study and then there's the analysis. Many of the studies that are analyzed as cross-lagged were not designed as a cross-lagged study specifically. They were designed as multiwave longitudinal studies.

Q. Let me see if I can ask it: Have you ever had involvement where you designed a lagged or cross-lagged longitudinal study?

MS. EMMEL: Objection, vague.

A. Again, I'm sorry I'm going back to that thing; that is, I have designed and been involved in designing longitudinal studies with multiple waves. You can analyze those.

So it's a mixing of design of various study and how it is analyzed. That's the part that is not clear in my mind. And I don't think people who design longitudinal studies necessarily design it as a cross-lagged or a lagged.

Q. Thank you.

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Dr. Mojtabai, have you ever published anything that states that social media causes addiction?

A. So can you define to me "causes," what causes means.

Q. It's the same definition that you use in your expert report, okay?

MS. EMMEL: Objection, vague.

A. If you have read the report, you realize that definition of cause or causal factors is not a black and white. Causes or contributing factors are determined based on number of factors.

BY MR. DAVIS:

Q. Let's see if I can narrow it down.

Have you ever stated in a publication, writing or any lecture that you believe that social media causes or substantially contributes in some way to addiction?

MS. EMMEL: Objection, vague and ambiguous, compound.

A. Yeah, and also, I'm not sure what addiction, again, you have to define

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what addiction --

BY MR. DAVIS:

Q. I'm using the definition that you use in your report.

With that in mind, have you ever made any publication or statement along those lines?

MS. EMMEL: Objection, vague, compound.

A. That social media causes addiction or can you -- it's not a question that I can answer like that. I have published -- I can qualify or --

BY MR. DAVIS:

Q. I want to know if you've ever said publicly in any place in your writings, in your lectures, or state -- where you have said that social media causes addiction.

Have you made such a statement?

MS. EMMEL: Objection, vague, compound.

A. I have made the statement that is it a substantial contributing factor or cause to social -- to adverse mental health.

///

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BY MR. DAVIS:
Q. Where have you made that statement?
A. I believe that in the Riehm paper that you mentioned, that's one of the claims we make. There is also a more recent paper, 2024, in which I talk about social media use explaining increase in internalizing symptoms in more recent years among adolescents.
Q. Okay. So when we go to the Riehm 2019 paper and your 2024 paper, we're going to find a statement that says social media causes addiction?
MS. EMMEL: Objection, vague.
A. That statement?
BY MR. DAVIS:
Q. Yes.
A. Causes?
Q. Yes.
A. You may not find that statement stated like that.
Q. Have you ever published anything to your scientific peers or given a lecture where you have stated that social

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media causes psychiatric disorders of any kind?
MS. EMMEL: Objection, vague.
A. So what you are asking, no epidemiologist, no scientist -- I would think -- there might be some -- none that I know -- would make such a statement about any causal factors in those terms.
If it was that clear that it causes, why do we do research? We do research because we have questions, and our answers are often probabilistic, to say that more likely than not, social media is a contributing cause to adverse mental health outcomes.
BY MR. DAVIS:
Q. Have you ever said that statement in any publication or in any lecture that you've given to other scientists, researchers or doctors?
MS. EMMEL: Objection, vague and compound.
A. I have implied in my writing, and if you read it, you know, it is in the scientific -- it's couched in scientific

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terminology, in terms of epidemiology research.
BY MR. DAVIS:
Q. So if I looked at your writings --
A. Yes.
Q. -- and I looked at your presentations that you give to other doctors and scientists --
A. Yes.
Q. -- I won't find a statement from you that says that social media causes any psychiatric disorder, fair?
MS. EMMEL: Objection, vague and compound.
A. Not in those terms.
BY MR. DAVIS:
Q. I won't find a statement either that says that social media contributes to psychiatric disorders either, will I?
MS. EMMEL: Objection, vague.
A. You would find that in terms of -- in what is implied in the statement.
BY MR. DAVIS:
Q. So I'll find some implied

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statement, but I won't find an explicit statement that social media causes or contributes to any psychiatric disorder; is that fair?
MS. EMMEL: Objection, vague and compound.
A. As I said, that's not the standard of research. We don't make statements as X causes Y, because it won't be accepted in scientific community.
BY MR. DAVIS:
Q. Okay. So -- and I won't find a statement from you, in your publications or in lectures that you've given to other scientists or doctors, that social media contributes to a psychiatric disorder?
MS. EMMEL: Objection, vague and compound.
A. You would find that --
BY MR. DAVIS:
Q. That it contributes?
A. Yeah, it's a contributing factor.
Q. Where -- what publication have you ever authored or what presentation that

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you have ever given that says that social media contributes in a causal way to psychiatric disorders?

MS. EMMEL: Objection, vague and compound.

A. I believe that, for example, the publication that I said in 2024.

BY MR. DAVIS:

Q. Okay. We'll find that in 2024?

A. Yeah.

Q. Any other place?

A. I'm thinking.

We might actually have -- we might have said something like that in the Riehm paper. I'm not sure exactly.

Q. Any other place that you can think of besides your 2024 paper and the Riehm 2019 article?

MS. EMMEL: Objection, vague and compound.

A. I'm thinking about publications that I might have had or presentations.

I don't recall at this time.

BY MR. DAVIS:

Q. Okay. Now, are you currently

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seeing patients?

A. Not currently.

Q. When is the last time you treated patients clinically?

A. About a year and a half ago.

Q. And over the course of your career, what's been the percentage of your clinical practice?

A. It has varied over time. Most recently, year and a half ago, it was about 20%.

Q. Okay. Have you ever diagnosed any patient of any age with either social media addiction or something that you would consider to fall into that category?

MS. EMMEL: Objection, vague.

A. I've seen patients who have had problems with social media which I thought were contributing to their psychiatric problems, mental health problems.

BY MR. DAVIS:

Q. Okay. I'm specifically asking you: Have you ever diagnosed a patient with social media addiction or something that you would say would fit that description?

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MS. EMMEL: Objection, vague and ambiguous.

A. In my practice of adults -- I didn't see adolescents and children -- I haven't made that diagnosis.

BY MR. DAVIS:

Q. Okay. You haven't made that diagnosis in a pediatric patient, fair?

A. I don't see patients -- children and adolescent patients.

Q. So you haven't made that diagnosis, right?

A. I have not.

Q. Okay. Have you made that diagnosis of social media addiction in any adult patient?

MS. EMMEL: Objection, foundation.

A. So there is no official diagnosis of social media addiction, but I have -- as I mentioned, I have seen patients who spent a large amount of time on social media, and at the time, my opinion was that it was a contributing factor to their mental health problems.

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BY MR. DAVIS:

Q. Did you write in their chart for those patients that they had a diagnosis of social media addiction?

A. As I mentioned, there's no diagnosis of social media addiction.

Q. So you wouldn't have written it in the chart; is that fair?

A. I have probably written that social media overuse or excessive use or addictive use of social media is a contributing factor to their mental health problems.

Q. Okay. And how many patients have you done that in?

MS. EMMEL: Objection, speculation.

A. As I said, it's over a year and a half I haven't seen patients, and I saw patients for 20 years, so I can't recall exactly how many.

BY MR. DAVIS:

Q. How many patients, with certainty, can you say that you actually made that statement or made that assessment for

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those patients?
MS. EMMEL: Objection, vague.
A. What I recall is two patients that I recall I did do that.
BY MR. DAVIS:
Q. Now, Dr. Mojtabai, you don't hold yourself out as an expert in digital technology, do you?
A. No.
Q. And you don't hold yourself out as an expert in social media platforms or how to use them, do you?
A. No.
Q. And you don't hold yourself out as an expert on how or why people may engage in social media use or other forms of digital technology; is that fair?
MS. EMMEL: Objection, compound.
A. That is a -- that's a -- I'm not sure what it means, how and why people engage in social media. I don't know what expertise it falls into.
BY MR. DAVIS:
Q. Do you have expertise in the

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area of how and why people engage in social media use?
MS. EMMEL: Objection, compound.
A. I don't exactly -- is it a biostat expertise? Is it an epidemiology expertise? Is it knowledge of methods of research that engage that? I don't know if there is an expert in how and why people engage in social media. What is that person called?
BY MR. DAVIS:
Q. Do you hold yourself out as such a person to your scientific colleagues?
MS. EMMEL: Objection, vague.
A. Since I don't know what it is that we're talking about, I can't tell you if I hold myself --
BY MR. DAVIS:
Q. All right. Do you hold yourself out as an expert in sleep disorders?
A. No.
Q. Do you hold yourself out as an expert in any eating disorder?
A. No.

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Q. Do you hold yourself out as an expert in body dysmorphic disorder?
A. To the extent that I'm a psychiatrist, psychologist, and I have knowledge of both eating disorders and body dysmorphic disorders as mental health problems, I can say that I have some knowledge of that.
Q. Sure.
But are you holding yourself out as an expert to your scientific colleagues as an expert in either eating disorders or body dysmorphic disorders?
MS. EMMEL: Objection, compound.
A. As a -- not as a psychiatrist who focuses on eating disorder or body dysmorphic disorder.
BY MR. DAVIS:
Q. And is it okay with you if I call body dysmorphic disorder at times BDD for --
A. That's fine.
Q. Okay. Thanks.
Do you hold yourself out as an

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expert in either suicidal thoughts, behavior or completed suicides?
A. I have published on suicide as an outcome of mental health problems, and I have done some research on that.
Q. Do you hold yourself out as an expert on reading and interpreting fMRI studies?
A. No.
Q. Do you hold yourself out as an expert in dopamine?
A. Again, I don't -- you know, it's not clear to me what an expert in dopamine is. Is it a biochemist you're talking about or is it a neurochemist you're talking about?
Are these -- yeah.
Q. Have you done any research on dopamine?
A. I have not.
Q. Have you done any -- do you have any publications on dopamine?
A. I cannot recall.
Q. Have you ever done any assessment of the role of dopamine in

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addiction?
A. So I have been involved in research for 30 years and collaborated on projects. I cannot, with certainty, say that I have not. So it's in my CV if there is any.
Q. Okay. But anything that comes to mind today?
A. Not today.
Q. Okay. And there are -- there are people in the addiction field who specialize in addiction and treating addictive disorders, right?
A. Correct.
Q. Are you one of those people?
A. I do not -- I am not an addiction psychiatrist, if your question is that.
Q. And do you hold yourself -- and in terms of the clinical practice that you've had over your career, what percentage of people who you -- who you were the primary doctor for treating a substance abuse disorder or a behavioral addiction?
A. A large proportion, I would

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say, of any psychiatric population would have a substance use disorder --
Q. Sure.
But I'm asking, of that percentage of your patients, which of those -- that percentage that were -- had substance abuse disorder or behavioral addiction, of that patient population, what percentage were you the primary treater for those patients?
MS. EMMEL: Objection, compound, speculation.
A. I would say about 30%. I mean, it's just a guess. I don't know if making guesses is -- so I would say about 30% had either primary -- that was their primary problem or secondary problem.
BY MR. DAVIS:
Q. And were you the person who was primarily treating them for their psychiatric addiction --
A. Yeah.
Q. -- or disorder or were you referring it out?
A. No, I was --

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MS. EMMEL: Objection, speculation.
A. Well, I was treating them as primary provider.
BY MR. DAVIS:
Q. Have you ever analyzed -- strike that.
Outside of your work in social media litigation, have you ever analyzed the scientific literature on a topic or issue using the Bradford Hill criteria?
MS. EMMEL: Objection, vague.
A. So Bradford Hill criteria are means of establishing or strengthening causal beliefs, so much of my work, my research work, involves exploring causal beliefs or causes of various mental health conditions.
So I would say that even if I'm not mentioning Bradford Hill in my publications, I am following his guidelines in spirit.
Q. Now, you're not offering any opinions in this case on the actual design of the defendants' social media platforms, are you? In terms of how they were designed,

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aspects -- in terms of actual design of what they -- let me back up.
You're not offering any opinions in the case about the actual design of the defendants' social media platforms, are you?
MS. EMMEL: Objection, compound and vague.
A. Well, actual design, I don't know what exactly is meant.
BY MR. DAVIS:
Q. In terms of how the algorithm, how the platform was put together, that's not something you're offering opinions on, are you?
A. I'm not a software engineer, if you're asking that question --
Q. Yeah.
A. -- of what is involved in designing apps.
Q. You haven't been asked in this case and you're not offering any opinions about how the defendants' platforms should be designed differently; is that fair?
MS. EMMEL: Objection, vague.

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A. Again, that should be designed is -- I mean, I have opinions about the harms associated with some of those features, and so when you have an opinion about the harms associated with a feature or algorithm, so you have some opinion about how it should be designed also implied there.
BY MR. DAVIS:
Q. Okay. But you haven't set out in your report in any way any specific design that any of the defendants' platforms should utilize in order to mitigate, reduce or eliminate any mental health outcome; is that fair?
MS. EMMEL: Objection, compound and vague.
A. I have not explicitly advised or opined on how they should change the apps.
BY MR. DAVIS:
Q. Okay. You don't have any opinions also on any of the defendants' conduct or business practices, do you?
MS. EMMEL: Objection.
A. I don't have -- I don't have any opinions on that.

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MS. EMMEL: Vague.
BY MR. DAVIS:
Q. You don't have -- you're not offering any opinions in the case about any warnings that should or should not accompany the use of social media, do you?
MS. EMMEL: Objection, vague and compound.
A. Well, I have opinions about the harms associated with these features, and that implies that there should be warning or those features should be mitigated in some ways.
BY MR. DAVIS:
Q. You don't set out in your report in any way what warnings should or should not accompany the use of social media, do you?
A. I do not.
MS. EMMEL: Objection.
BY MR. DAVIS:
Q. And you haven't developed yourself any warnings that should or should not be given with respect to social media, have you?

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MS. EMMEL: Objection, vague and compound.
A. I have not.
BY MR. DAVIS:
Q. Okay. And you're not offering any opinions about the motive of any of the defendants' actions or conduct, are you?
MS. EMMEL: Objection, compound.
A. I might have -- now that I think about it, I might have. And I talk about some of the features and some of the internal documents that we're talking about specific features that, for example, engagement was given priority over potential harms of some features.
BY MR. DAVIS:
Q. Okay.
A. But it has been based on what was stated in the internal reports or --
Q. So your views about any motives that any of the defendants had about aspects or features of social media come from your review of depositions or documents of the companies?

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MS. EMMEL: Objection, compound, vague.
A. Correct.
BY MR. DAVIS:
Q. Okay. Now, as part of your own research, you don't do work where you actually look at internal company documents or testimony to determine whether or not there's a causal assessment, do you?
A. I don't routinely.
Q. You never have done that outside of -- outside of this litigation, have you?
A. I don't recall having done that.
Q. Right.
And is it fair to say that the internal documents and the deposition testimony that you reviewed for your opinions are -- they're not the type of information that you would use as someone who works in observational studies or experimental studies?
MS. EMMEL: Objection, compound and vague.

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A. There were a number of elements in your question.
You said somebody like -- or type of documents somebody like you would use. So I recall some of my colleagues have used internal depositions of -- in the case of opioid use disorders, at the university where I worked before, at Johns Hopkins, they were using these documents.
So it is a legitimate approach to some questions.
BY MR. DAVIS:
Q. Let me ask you this: Outside of litigation, have you ever used internal company documents or deposition testimony to make an assessment of whether or not an exposure results -- has a causal effect on an outcome?
MS. EMMEL: Objection, compound and vague.
A. I do not recall having done that.
BY MR. DAVIS:
Q. Nothing comes to mind today, does it?

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A. It doesn't come to my mind.
Q. And, of course, the internal documents and the deposition testimony, they are not observational studies or RCTs, are they?
MS. EMMEL: Objection, compound.
A. Some of them were observational studies.
BY MR. DAVIS:
Q. None of -- let me rephrase.
None of the documents that you looked at, none of the deposition testimony that you looked at discussed longitudinal or RCTs, did they?
MS. EMMEL: Objection, compound.
A. I believe -- I mean, I'm vague now, but there might have been experiments like changing features. I'm not exactly sure right now.
BY MR. DAVIS:
Q. What are you referring to where there's some document that changes features that was part of an RCT?

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A. I have to go back to the report to see if those were reflected in my report or not.
But I recall there were some -- because not everything I reviewed ended up in my report.
Q. There's no discussion in your report of an internal document or deposition testimony that is an experimental study from an internal company -- from one of the internal company documents, is there?
MS. EMMEL: Objection, compound.
A. I don't recall. As I said, I'm not exactly sure. But I have seen in -- I recall in the depositions mention of A-B design manipulations of some features and looking at the impact of those.
BY MR. DAVIS:
Q. All right. When we get to a break, I'm going to ask you what you're -- see if you can take a look at that at the break, but let's keep going until then.
A. Sure.
Q. Going back to what you're --

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what you were asked to do, back to page 1.
A. Okay.
Q. Where you were retained by counsel to prepare an expert report on what relationship there is, if any, between social media use and adverse mental health outcomes in adolescents and youth.
Do you see that?
A. I have been retained, yes -- yes.
Q. Okay. And you agree that to assess the causal relationship, if any, between social media use and adverse mental health outcomes, you must look at studies that specifically assess social media use and not other forms of screen usage, such as television, smartphones or Internet use, right?
MS. EMMEL: Objection, misstates the report.
A. That is, yeah, my understanding, and I focused my research on -- for this report on social media.
BY MR. DAVIS:
Q. And also in order to answer

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that question, you must also assess the specific outcome that's being investigated, right?
A. Correct.
Q. And you agree that to assess a particular platform's causal relationship, if any, with an adverse mental health outcome, you must assess the specific platform and the specific mental condition, correct?
MS. EMMEL: Objection, vague and ambiguous, compound.
A. I do not agree with that. The reason is that it's hard to identify which platform adolescents are using these days.
The peer research shows that an average adolescent is using three or more platforms. And so there are also many similarities in features and algorithms across different platforms.
So as a result, you could look at the effect of social media use overall as its -- and its association with mental health outcomes.
BY MR. DAVIS:
Q. For your causal assessment that

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you did in this case, you didn't separate out each defendant's platform -- each defendant platform to make a causal assessment as to that specific platform, did you?
A. Where there was --
MS. EMMEL: Objection, compound.
A. Where there was literature that allowed me to do that, I tried to do that.
BY MR. DAVIS:
Q. No, I understand that you reviewed different literature that had discussed different platforms, but my question was a little bit different, which is: In your causal assessment, you did not separate out each defendant's platforms and make a causal assessment specific to that platform, did you?
MS. EMMEL: Objection, compound.
A. As I said, it's not possible in much of the research to specifically attribute the harms to a specific platform because they are assessing overall use of social media.

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BY MR. DAVIS:
Q. And because of that, you did not separate out each defendant's platform to make a causal assessment for that specific platform?
MS. EMMEL: Objection, compound.
A. As I said, if there were data on separate platforms, I looked at those.
BY MR. DAVIS:
Q. Right.
But again, I know you looked at data on different platforms, but your causal assessment didn't separate out each defendant's platforms to make a causal assessment, did you?
A. So you're asking, for example, did I say Snapchat is -- meets these criteria. If there were data, I would have done that. But -- and I might have attempted to do that.
For example, I tried to do that with short video platforms that are associated with social comparison. So there are places where you can separate specific

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media.
Q. So, for example, you know that there are four defendants in this case, right?
A. Correct.
Q. Right?
For example, you didn't take Snap's -- a study specific to Snap or the study specific to TikTok or Meta or YouTube, separate them out and say I'm going to analyze these studies with the specific studies that looked at each specific platform and make a causal assessment?
MS. EMMEL: Objection, compound and vague.
A. Where there were -- I'm not exactly sure where I talk about specific platforms, which I do in the report. I make specific analysis of this platform is associated, for example -- or is causally related to the outcomes.
However, I say that I look at features, specific features of platforms that might be associated with outcomes.
For example, I talk about Snap

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Maps and how it is contributing to FOMO, and that is associated -- FOMO is fear of missing out. And that might be associated with mental health outcomes.

So I wouldn't say, like, I haven't tried or haven't done this in this report. There are places that I have done it when data allowed me.

BY MR. DAVIS:

Q. Let's look at your Bradford Hill analysis, right? If you look at pages 77 through 79.

That sets out your Bradford Hill analysis with respect to your opinions in the case, right?

(Sotto voce document review.)

A. 77 to 79, correct?

BY MR. DAVIS:

Q. Right. Those pages set out your Bradford Hill analysis for the case, right?

A. Correct.

Q. And the Bradford Hill analysis, so we're talking about the same thing, is that's a set of -- you call them guidelines,

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other people call them criteria, where -- that are used to make causal assessments, right?

A. Correct.

MS. EMMEL: Objection, compound and vague.

BY MR. DAVIS:

Q. And with respect to the causal assessment that you made using the Bradford Hill criteria, you did not go through each individual platform or features of a specific platform to analyze those for a causal assessment, did you?

MS. EMMEL: Objection, compound and foundation.

A. At places I did. For example, on page 78, I say: Nevertheless, some findings point to specificity of relationship. For example, the finding that use of more "visual" media has a stronger relationship with body image dissatisfaction.

So I think there I'm talking about some of these apps that are more visual.

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BY MR. DAVIS:

Q. I think we're miscommunicating. Let me see if I can ask a better question.

In your Bradford Hill criteria, you didn't set out an analysis specific to Snap, specific to Meta, specific to TikTok or specific to YouTube, did you?

MS. EMMEL: Objection, foundation and compound.

A. I do not -- I did not because there was not enough data --

BY MR. DAVIS:

Q. Okay.

A. -- to do that for each specific app. And I don't think it is appropriate, even, for the reasons I said.

Q. Okay. Now, if you look at page 28, second-to-last paragraph in your report, you state that: The group of most interest to me is adolescents and young adults.

Do you see that?

A. Which paragraph on page 28?

Q. Page 28, second-to-last paragraph.

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A. Second-to-last.

The group of most interest to me is adolescents and young -- yes.

Q. Do you see that?

A. Yes.

Q. Now -- and so, by adolescents, what age range is that?

A. Well, I mean, you could -- I don't think there is a clear definition. For teenage there is, but -- go from 13 to 19. I would say it's overlapping, yeah, that age group, teenage group.

Q. 13 to 19?

A. I would say.

Q. And for young adults, what's that age range?

A. I would go up to 25.

Q. Okay. Did you assess any age range outside of that -- of those two age ranges?

A. Some of the studies I looked at did not separate the age groups, and reported on a range of age, and some of them I did refer to the studies I referred to.

Q. Let me ask it a different way.

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A. Okay.
Q. For purposes of a causal assessment, you believe that the 13 to 15 -- excuse me. Strike that.
For purposes of a causal assessment, you believe that the most significant age ranges are 13 to 19 and up -- and for young adults, up to 25, right?
MS. EMMEL: Objection, foundation, compound, misstates testimony.
A. Can you repeat the question?
BY MR. DAVIS:
Q. Sure, I'll ask it again.
For making a causal assessment, you believe that the most important age range is 13 to 19 for adolescents, and for young adults, 18 and up to 25?
MS. EMMEL: Same objections.
A. This was my interest group, the group that is, I believe, most vulnerable to the adverse effects of social media.
BY MR. DAVIS:
Q. Okay. And that's why you looked at that specific age range, right?

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A. Correct.
Q. Okay. Now, for purposes of -- you recognize that a number of the studies you rely upon have study participants that fall outside of those age ranges, right?
MS. EMMEL: Objection, vague.
A. And including those age ranges. And some of them might actually fall outside.
BY MR. DAVIS:
Q. Yeah.
So nonetheless, despite that, you included them in your analysis, right?
A. I might have, some.
Q. Now, if you look at -- turn to page 73.
MS. EMMEL: We've been going for over an hour, just when --
MR. DAVIS: Yeah, I'm almost wrapped up with a topic, and then we can take a break, if that's okay with you.
MS. EMMEL: All right.
BY MR. DAVIS:
Q. You see on page 73 the third paragraph, Dr. Mojtabai, you say: The topic

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of my report is the association of maladaptive use of social media (excessive use, addictive use, social comparison) with mental health outcomes.
Did I read that correctly?
A. Correct.
Q. That is, in fact, the topic and the subject matter of your report, right?
A. Correct.
Q. Okay. And now, if you look at -- there were several outcomes you looked at, correct? You looked at depression, anxiety symptoms, correct?
A. Correct.
Q. You looked at suicide, suicidal ideation and attempts, right?
A. Correct.
Q. You looked at body image dissatisfaction or eating disorder symptoms, right?
A. Correct.
Q. You looked at sleep problems, right?
A. Correct.
Q. Are there any others that you

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looked at that you're going to offer an opinion on that there's a causal relationship?
MS. EMMEL: Objection, vague.
A. I'm thinking to -- if there are other outcomes that I probably mention or discuss, but those are the main outcomes.
BY MR. DAVIS:
Q. Any others come to mind? Because I just want to make sure I leave here with a complete list.
Any others that you know of?
MS. EMMEL: Objection, vague.
A. To the extent that social comparison is distressful by itself, that also comes to mind.
Also you mentioned depression. Much of this research on depressive symptoms overlap or are used synonymously, internalizing symptoms. So that, I also want to make a point about.
BY MR. DAVIS:
Q. Other than internalizing symptoms or social comparisons, any others that I need to add to the list?

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MS. EMMEL: Objection, vague.
A. Doesn't come to my mind right now.
BY MR. DAVIS:
Q. Okay. You didn't include well-being, like general well-being, because you thought that was too loose of a definition?
MS. EMMEL: Objection, foundation.
A. That was one reason. It is not very clearly defined. It could be satisfaction with life. I've seen different definitions in different -- in different reports.
And also, another reason is that my focus was on mental health -- adverse mental health outcomes, so I mostly focused on those outcomes you mentioned.
I may have mentioned a study that looked at well-being, but I don't think many.
BY MR. DAVIS:
Q. You mentioned earlier FOMO or fear of missing out, right?

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A. Right.
Q. That's not a psychiatric disorder, is it?
A. No, it's not.
MS. EMMEL: Objection, vague.
BY MR. DAVIS:
Q. All right. With respect to -- if you look at page 5 -- look at Section 5.5. That's on page 39.
A. Yes.
Oh, can I make an addition? One of the things I don't know if you mentioned it was addictive use of social media as an outcome. Was it in your list?
Q. Okay. Your view is that the addictive nature of social media leads to these different mental health outcomes, right?
MS. EMMEL: Objection, foundation.
A. As well as addictive use of social media itself. The features lead to addictive use. Addictive use could lead to other problems or excessive use of social media itself could lead to adverse mental

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health outcomes.
BY MR. DAVIS:
Q. So in terms of addictive use that doesn't lead to -- help me out here.
I think you agree with me that your view is that addictive use of social media leads to these different mental health outcomes that we just talked about, right?
MS. EMMEL: Objection, foundation, vague.
A. That could contribute to that, yes.
BY MR. DAVIS:
Q. Okay. And so outside of those, show me in your -- where in your report do you discuss other mental health outcomes that result from what you view as addictive use?
MS. EMMEL: Objection, vague.
A. I think where I talk about addictive use, I talk about relationship of addictive use or problematic use. These two terms are used interchangeably in the literature -- and their association with depressive symptoms or anxiety symptoms or internalizing symptoms. I do believe that I

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do that.
And in my research in my 2024 paper, I look at both amount of use as for less problematic use contributing to internalizing symptoms.
BY MR. DAVIS:
Q. I'm going to unpack that answer a little bit because it was helpful --
A. Sure.
Q. -- to me to understand where you're coming from.
A. Sure.
Q. Your view is that problematic social media use is the same as social media addiction, right?
MS. EMMEL: Objection, misstates testimony.
A. What I said is that different reports use different terms, and some -- some of the literature identifies problematic use as a less severe form of addictive use, but it's not consistent.
BY MR. DAVIS:
Q. You're using the term "social media addiction" to be synonymous with

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problematic social media use?
MS. EMMEL: Objection, misstates testimony.
A. I use it interchangeable with addictive use of medication -- of social media.
BY MR. DAVIS:
Q. Okay. So other than depressive or anxiety symptoms resulting from addictive use of social media, do you identify any other mental -- any other outcomes that you connect addiction with?
MS. EMMEL: Objection, vague.
A. Can you rephrase your question?
BY MR. DAVIS:
Q. Right.
In your report, other than anxiety symptoms and depressive symptoms --
A. Right.
Q. -- do you identify any other outcomes, health outcomes that result from what you say is social media addiction?
MS. EMMEL: Objection, vague.
A. I don't exactly recall, but it might be -- I have to look at the report --

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where I talk about dissatisfaction with body shape, dissatisfaction with body also being related to addictive use.
BY MR. DAVIS:
Q. Anything else?
A. I talk about academic outcomes also being related to addictive use.
Q. Anything else?
MS. EMMEL: Objection, vague.
A. And those come to my mind.
BY MR. DAVIS:
Q. Anything else I need to add to the list?
MS. EMMEL: Objection, vague.
A. I'm thinking about others that might be.
I have to look at the suicidal ideations; that might be also another that I have talked about.
BY MR. DAVIS:
Q. Okay.
A. I have to look again.
Q. Got that one now on the list.
What others?
MS. EMMEL: Objection, vague.

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A. You may want to add that to the list of the outcomes that I'm discussing in my report also, suicidal ideations.
I can't think of any at this time.
BY MR. DAVIS:
Q. Okay. If you look at section -- page 39, 5.5 --
A. Yes.
Q. -- you say -- sorry.
Page 42 -- sorry, I'm on the wrong page. Page 42, 5.6.1 of your report.
A. Yes.
Q. Okay. You state that, in the header: Unhealthy use of social media may be related to body dysmorphic disorder and eating disorders.
Do you see that?
A. Yeah.
Q. I just want to be clear: Is it your opinion to a reasonable degree of medical or scientific probability that social media causes body dysmorphic disorder or any eating disorder?
MS. EMMEL: Objection, vague,

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compound.
A. It is a substantial contributing factor or cause.
BY MR. DAVIS:
Q. And when you're using the term "substantial contributing factor or cause," what does that mean to you?
A. That means that meaningful relationship exists. More likely than not, this is contributing to outcomes for a sizable group of people in the population that is impacted.
Q. When you say more likely than not, what percentage is that?
MS. EMMEL: Objection, vague.
A. I can't put percentages on that. It's context dependent. Because let's say an exposure is, like, all adolescents in the United States are using them, then the effect would be magnified by the number of people who are exposed, so...
BY MR. DAVIS:
Q. Is it fair to say that for a substantial contributing factor or cause, you can't put a percentage on what that is in

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terms of zero to a hundred in terms of an impact that it's having on a population of people; is that fair?

MS. EMMEL: Objection, vague, speculation, compound.

A. Well, zero to a hundred is a very broad range. You would need -- zero means no impact, 100% means that everybody who is exposed experiences the outcome and nobody who does not experience the outcome is -- who experiences the outcome is not sort of among those who are not exposed.

So those are very extremes, but that includes everything.

BY MR. DAVIS:

Q. And I'm asking you: On a population basis --

A. Right.

Q. -- using the term "substantial contributing factor or cause," where does social media fall in terms of zero to a hundred percent for causing any mental health outcome?

MS. EMMEL: Objection, vague, speculation, compound.

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A. I believe I do make some calculations in the report that give a sense, at least one -- and that's on page 39. I do make some calculations for the odds ratio of 1.55. So some research would suggest the odds ratio is about that.

BY MR. DAVIS:

Q. And I'm not asking about some research. I'm asking for your overall opinion.

When you're using the term "substantial contributing factor or cause" as it relates to social media causing or having some effect on a population of people, can you say it falls within this range or that range?

MS. EMMEL: Objection, vague, speculation, compound.

A. I cannot, but I cannot say this is the exact number because it's context dependent.

BY MR. DAVIS:

Q. So, for example, if I said, Dr. Mojtabai, I want you to put that number somewhere between zero and a hundred percent,

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could you put it anywhere on that scale?

A. Between zero and a hundred percent? I would say show me the evidence, show me the study that has been done and let's compute the odds ratio, let's compute the Pearson's correlation and let's see what is the extent of prevalence of exposure to that outcome.

Then we decide if it's an important factor or not.

Q. But I'm asking you in terms of how you use the term "substantial contributing factor or cause," okay? Because that's your overall opinion in the case, is that there's -- that that has been shown with the scientific evidence with respect to social media and different mental health outcomes, right?

MS. EMMEL: Objection, vague, asked and answered.

A. I said it's context dependent. So you have to give me all those parameters, and I say it's a substantial factor or not.

BY MR. DAVIS:

Q. I'm asking you for any mental

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health outcome that you identify in your report that you connect up with social media, where do you put social media on the scale between zero and a hundred?

MS. EMMEL: Objection, asked and answered multiple times.

A. Yeah, I believe this is coming from my own research, page 39. I do believe that is a substantial cause -- causal factor based on these calculations.

Now, if you are talking about a different outcome, a different exposure, a different population, my response would be different.

BY MR. DAVIS:

Q. Does substantial contributing factor or cause mean to you 30%?

MS. EMMEL: Objection.

BY MR. DAVIS:

Q. 40%, 70%? What does it mean to you?

MS. EMMEL: Objection, compound, asked and answered.

A. Context dependent.

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BY MR. DAVIS:
Q. You can't answer that today?
MS. EMMEL: Objection, misstates testimony.
A. I cannot -- I cannot put a specific number without knowing the context.
BY MR. DAVIS:
Q. I'm talking about the context is your overall opinion in the case. That's the context.
Can you put a number on it using that as the context?
MS. EMMEL: Objection, asked and answered.
A. So this study is based on exposure to social media in more than three hours of social media and more than six hours of social media, and then looks at internalizing symptoms in US adolescents.
And so that's why I did the computation, because if I knew beforehand that there is a number, let's say, an odds ratio of 2 means substantial, or an odds ratio of 1.1 means substantial, then I wouldn't do the computations.

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I do the computations to show the impact, the population impact of that.
BY MR. DAVIS:
Q. What's the study you're referring to, Dr. Mojtabai?
A. That's at page 39. That's the study that Riehm and I were involved in and looked at the more than three hours per day of social media use and also six and more. And then we -- I took those numbers and did the computations.
Based on that, came up with a number, so number, percentage, what you may call percentage.
What percent more people would be -- it's 9.1% more of adolescents if they use more than three hours, versus less than three hours, would experience severe internalizing symptoms.
Q. Yeah. But I'm not asking about specifics today. I'm asking about after you've looked at every piece of data that you have available to you in this case, and you've come to the conclusion that social media is a substantial contributing factor or

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cause --
A. Right.
Q. -- to different mental health outcomes and addiction, and my question to you is -- that's your opinion. Where on the scale between zero and a hundred percent do you place the percentage with scientific certainty?
MS. EMMEL: Objection. Counsel, the questioning is becoming harassing, so object on harassment and asked and answered.
A. Again, it depends. I repeat my answer: Depends on the outcome and the exposure, the population prevalence of the exposure.
BY MR. DAVIS:
Q. Can you give me a percentage today?
A. I cannot.
MS. EMMEL: Objection, asked and answered.
MR. DAVIS: All right. Let's take a break.
THE VIDEOGRAPHER: All right.

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We're off the record at 10:35 a.m. That's the end of Media 1.
(Recess taken, 10:35 a.m. to 10:50 a.m. CDT)
THE VIDEOGRAPHER: We're back on the record at 10:50 a.m. This is the beginning of Media 2.
BY MR. DAVIS:
Q. Dr. Mojtabai, are you ready to continue?
A. Yes.
Q. Great. Okay.
If you can look at Exhibit 5, which is your expert report. You understood as part of you participating as an expert in the litigation that you had to do a written report, right?
A. Yes.
Q. And you understood that the purpose of the report was to allow the defendants to know what your opinions were and the bases of those opinions, right?
MS. EMMEL: Objection, speculation.
Also just, for the record, the

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May report is the operative report as it's a supplemental report to the April 18th report, which is marked as the exhibit.
A. I also like that, because it has numbering before --
BY MR. DAVIS:
Q. Let me ask you this, Dr. Mojtabai. Let's focus on -- go back to my question.
You understood the purpose for doing a report in the case was -- the purpose was to set out your opinions that you would offer at trial and also so that the defendants could know what your opinions were and the bases for them, right?
MS. EMMEL: Objection, foundation, misstates testimony.
A. Can you rephrase it, please.
BY MR. DAVIS:
Q. Sure.
You understood that the purpose of the report was to set out your opinions and the bases for them, right?
MS. EMMEL: Objection,

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misstates testimony.
A. It is to reflect my views and opinions based on the totality of evidence.
BY MR. DAVIS:
Q. Right.
And it's also to reflect your opinions based upon the material you reviewed and what you reviewed, right?
MS. EMMEL: Objection.
Counsel, let's go off the record for a second. I'd like to discuss the questioning.
MR. DAVIS: I'm not agreeing to go off.
Dr. Mojtabai, can you answer my question?
MS. EMMEL: Objection, this is not -- this is not a line of questioning for the witness to answer. He does not -- he does not understand the legal proceedings.
MR. DAVIS: I'm just asking for his understanding. I don't think that's controversial.
MS. McNABB: We can have the

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witness step out of the room, but I think this is a point of clarification that counsel needs to address without the -- we can have Dr. Mojtabai step out.
MR. DAVIS: That's fine. Okay. Let's go off the record.
THE VIDEOGRAPHER: All right. We're off the record at 10:53 a.m. That's the end of Media 2.
(Recess taken, 10:53 a.m. to 10:56 a.m. CDT)
THE VIDEOGRAPHER: We're back on the record at 10:56 a.m. This is the beginning of Media 3.
BY MR. DAVIS:
Q. Dr. Mojtabai, you're back. Are you ready to continue?
A. Yes.
Q. Awesome. All right. I'm going to pick up where I left off.
Exhibit 5 is your April 18, 2025 report, right?
A. Correct.
Q. Now, your understanding was you

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had to do a written report for the case, right?
MS. EMMEL: Objection, foundation.
A. Yes.
BY MR. DAVIS:
Q. Right.
And you understood that the purpose was for you to set out your opinions and the materials that you were using to rely on -- to form those opinions, right?
MS. EMMEL: Objection, foundation, vague.
A. So some of the materials I relied on, those are the empirical studies. There are some internal documents that I also considered, but my opinions rely on the empirical evidence that comes from published literature.
BY MR. DAVIS:
Q. Right.
And just so I'm understanding what you're saying, when you put together your report for the case, you set out the literature and whatever documents that you

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had reviewed and considered to form your opinions, right?
MS. EMMEL: Objection, compound.
A. Yes, I considered some evidence and relied on some other.
BY MR. DAVIS:
Q. Right.
And your -- when you finished that report on April 18, 2025, you considered that that -- those were what your opinions were going to be in the case, right?
MS. EMMEL: Objection, vague, compound.
A. So literature in this area is evolving very fast, so I didn't consider that to be, you know, my ongoing opinion on the case.
BY MR. DAVIS:
Q. All I'm asking for: When you finished that report, it reflected your opinions as of April 18, 2025, right -- or -- yeah, April 18, 2025, right?
A. Yeah.
Q. And so the opinions that you --

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anything in that report, other than typos, that you want to change?
MS. EMMEL: Objection.
He has submitted a supplemental report since this report. That question is not -- is not accurate, and it misrepresents the nature of this report. This is an old report.
BY MR. DAVIS:
Q. Dr. Mojtabai, my question stands: Anything from that April 18, 2025 report that you think is inaccurate and you want to change, other than typos?
MS. EMMEL: Objection. This report has been changed. Misstates the situation of -- and the nature of this report. This is not a current report.
A. And I believe there were some calculations that had minor errors and I corrected them in more recent --
BY MR. DAVIS:
Q. Other than that, anything else you -- you want to tell me that you want to change from your April 18, 2025 report or

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other opinions that you have?
MS. EMMEL: Objection. This is harassing, and at this point it's clearly misleading. It's referring to the wrong report as the current report.
A. Yeah, I think -- I don't know. I have to compare, put them on a Word document -- Word software and see what are the changes, because there might have been minor changes, edits, rewordings, moving parts.
So -- so it doesn't have the same structure as the May, and that's why we -- I drafted the May report.
BY MR. DAVIS:
Q. Yeah. The May report, the May 2025 report, did you draft that for the federal litigation?
A. So I have to make this clarification: In my mind, they are the same, because I know that the litigation might be different. The courts might be different. If you notice, I was reimbursed for work on both at the same time.

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I was working on one report. I wasn't preparing a separate report for federal versus state.
Q. I'll ask it this way.
Other than the April 2025 report and the May 2025 report that you authored, is there any other opinions that you have in the case?
MS. EMMEL: Objection, vague.
A. Well --
MS. EMMEL: Foundation.
A. -- I think, as you saw, there is some material considered since May, and so some of those studies, one of them specifically stands in mind -- so supported some of my views. So there are that changing support level for my opinions, so...
BY MR. DAVIS:
Q. I'm only asking if there's anything from the April -- is there any opinion that's not in the April or the May 2025 report that you authored?
MS. EMMEL: Objection, asked and answered.
A. I can't recall except for the

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fact that there is some of the new evidence might have modified, strengthened or weakened some of my earlier opinions.
BY MR. DAVIS:
Q. Of the -- let's separate out the -- like, anything that was published after your April 2025 report, okay? Let's separate that out for the next question.
Any opinion -- if we separate that out -- separate that out, is there any new opinions or different opinions that you have from the April 2025 report?
MS. EMMEL: Objection, asked and answered.
A. I have to clarify. You said -- mentioned published. Some of these papers that were considered since May are published earlier. I found them later or I looked at them again and changed my mind.
BY MR. DAVIS:
Q. Okay. Other than what's in your April 2025 report and your May 2025 report, are there any other opinions that you would offer at the trial of this case?
MS. EMMEL: Objection, asked

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and answered, exact question, harassing.
A. So your question is about the trial, the trial that I don't know when it's going to happen, but it's in future?
I'm sure this is a very fast-evolving field, and there is new research coming out all the time, and I cannot, you know, speculate about what my opinion would be.
BY MR. DAVIS:
Q. I'll rephrase the question.
A. Okay.
Q. Sitting here today, other than what's in the April 2025 report and the May 2025 report, are there any other opinions that you have in the case?
MS. EMMEL: Asked and answered, harassing the witness.
A. No.
BY MR. DAVIS:
Q. Okay. Now, if you have an experimental or an observational study and you assess all eating disorders combined, does that study tell you whether or not there

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is an increased risk for any individual eating disorder?
A. Again, it's an empirical question for different disorders. I can only make this comment, that there is considerable overlap between eating disorders, and so that would suggest to me that there is good chance that all of those disorders -- good chance means that there's high probability that all of those disorders have changed.
You're talking about trends over time, I assume.
Q. So in your view, you can take a study of bulimia, anorexia or ARFID, A-R-F-I-D, and binge eating disorder, put them all together, and that study would tell you that there's an increased risk for every individual eating disorder?
MS. EMMEL: Objection, misstates testimony, compound.
A. I'm not sure -- if you have them separately, you could put them separately. The way you said it implies that you have data on individual disorders.
So you could put them all

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together, analyze them, make a comment about trends in eating disorders. You can then analyze them separately and say that the trends were similar across most disorders but, for example, one of those disorders, anorexia nervosa, for example, did not follow that general trend.
BY MR. DAVIS:
Q. Do you agree that the better practice is not to group all eating disorders together in an observational or experimental study, but rather to separate them out and study them individually?
MS. EMMEL: Objection, compound, vague --
A. What is -- I mean, I have to ask for explaining to me what better means in this context.
BY MR. DAVIS:
Q. More reliable.
A. Reliability means that the -- what you're doing can be repeated later on. That's what you mean?
Q. No, more -- is it -- let me just -- I've got a different question.

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A. Okay.
Q. Is it your opinion that if you take all eating disorders and you put them together in a single study, that -- and you just do a combined outcome for all eating disorders combined, does that give you reliable scientific data to say that whatever the exposure is, that it's increasing each individual eating disorder?
MS. EMMEL: Objection, vague, calls for speculation.
A. You can say that eating disorders are increasing, and if the prevalence of each eating disorder is very low, then I would argue that the better approach is to combine them. Because it gives you exactly what you said, more reliable estimates in terms of accuracy and precision of estimate of the temporal trends for any risk factors.
BY MR. DAVIS:
Q. When you take all eating disorders combined and you put them in a single study and measure that as the single outcome measure for an exposure --

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A. Right.
Q. -- that study doesn't tell you anything in a reliable way about individual risks for individual eating disorders, does it?
MS. EMMEL: Objection, speculation, vague, compound.
A. To the extent that eating disorders share commonalities and they do merge together, morph together, we know that for bulimia disorder and binge disorder, for example, there is a lot of back-and-forth. People sometimes have the purging, sometimes they don't have the purging.
For an epidemiological study, we often do that. We don't look at individual studies because the prevalence in the community might be too low. We talk about prevalence of eating disorders.
If you go to the literature, you will see epidemiological studies of eating disorders, and whether or not it applies to individual studies is a different question.
///

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BY MR. DAVIS:
Q. Prevalence is different from incidence, right?
A. Prevalence is different from incidence.
Q. Incidence tells you whether or not there are new cases --
A. Right.
Q. -- of a certain disorder or disease after an exposure, right?
A. Right.
MS. EMMEL: Objection, compound.
BY MR. DAVIS:
Q. Incidence, not prevalence, tells you whether or not there's an increased risk in a population that you're studying, right?
A. No, it's not correct what you said. Incidence tells you about rate. It's not a measure of risk.
Q. Okay. We'll talk about that.
Dr. Mojtabai, you put in your -- any of the studies that you put in your report, do you disagree with any of the

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findings?
MS. EMMEL: Objection, vague. Does not clarify which report is being referred to.
BY MR. DAVIS:
Q. Any of them.
A. Well, again, disagree with any of the findings? What is -- there is -- there are two different parts to your question. Can you please clarify?
Q. Sure.
A. One is I disagree with the way they analyzed the data, I disagree with their analysis reports, I disagree with interpretation of the results, I disagree with the implications they're drawing from those -- can you...
Q. Let me ask it a different way.
The studies that you rely upon, you accept them as they are, whatever methodological design or limitations that they have, right?
MS. EMMEL: Objection, vague, foundation.
A. What's accept --

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accepting is --
BY MR. DAVIS:
Q. Not accepting. Let me ask it a different way.
The studies that you rely upon have limitations in them, right?
A. Every research study has limitations.
Q. And the limitations that are identified in the studies are something that you have to take into consideration and factor in and accept when evaluating their impact into a causal assessment, right?
A. Accept -- I mean, there are so many different parts of it in what you said, and the last one was accept. I'm not sure what acceptance means.
Q. I'll rephrase it. I'll take out the word "accept."
The limitations that are identified in the studies are something that you have to take into consideration and factor in when evaluating their impact for a causal assessment, right?
MS. EMMEL: Objection,

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compound, vague.
A. I think you have to consider every part of the study, limitations as well as the strengths in assessing. And so it is -- again, it's case by case. Some studies have more strengths, some have more limitations. Some the design is more limited in contributing to causal understanding, and so some more -- so there are nuances. It's not a...
BY MR. DAVIS:
Q. You use the DSM-5 in your clinical practice?
A. I do.
Q. And you agree that it's the authoritative source for assessment of treatment and diagnosis of psychiatric disorders?
MS. EMMEL: Objection, vague, foundation.
A. Again, authoritative source has to be clarified. There are conditions that are not in DSM-IV, were added to DSM-5. 150 disorders were added to DSM-5. So "authoritative" here becomes a little bit --

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BY MR. DAVIS:
Q. The current DSM-5, you're currently using the DSM-5-TR, right?
A. Correct.
Q. Right?
And you consider that to be a reliable source of information for the treatment and diagnosis of psychiatric disorders, fair?
MS. EMMEL: Objection, vague, compound.
A. It doesn't provide guidance for treatment. It provides -- it's an index of diagnoses that have been recognized to the time -- to the time of when it was published in 2013.
BY MR. DAVIS:
Q. Social media addiction is not recognized as a psychiatric disorder or disorder of any kind in DSM-5-TR, is it?
A. It's not included among the disorders that are categorized, but --
Q. I'm sorry, I couldn't hear you.
A. It's not categorized among the disorders in DSM-5.

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Q. That are recognized?
A. That are included in DSM-5. "Recognized" is a -- again, a loaded word.
Q. DSM-5 does not have a diagnosis of social media addiction, does it?
A. That's a better question. It doesn't.
Q. Right.
ICD, whatever version of ICD, right -- which is the International Classification of Disease, right?
A. Right.
Q. The ICD doesn't have a recognized diagnosis of social media addiction, does it?
A. ICD does not either.
Q. Okay. Do you know -- and you use ICD even today in assess -- in diagnosing patients, right?
A. Yeah, it is used. ICD-10 now.
Q. Okay. There's no formal diagnostic criteria that's been generally accepted for what you call social media addiction, is there?
MS. EMMEL: Objection, vague,

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compound.
A. Again, there, "generally defined" is a vague statement. There are different criteria proposed, and they overlap quite a bit. There are some major commonalities among these criteria proposed.
BY MR. DAVIS:
Q. There's no diagnostic criteria for social media addiction that has been formally accepted or adopted by any psychiatric organization, true?
MS. EMMEL: Objection, asked and answered.
A. I believe that the Chinese classification of diseases has a social media -- an Internet addiction category.
BY MR. DAVIS:
Q. Okay. They don't have a social media addiction category, do they?
A. Not to my knowledge.
Q. All right. So let's go back to my question.
There's no diagnostic criteria for social media addiction that has been formally accepted or recognized by any

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psychiatric organization, true?
MS. EMMEL: Objection, asked and answered, vague.
A. Again, I have to clarify. These are not set in stone. The criteria evolve between DSM-IV, DSM-5, a hundred new -- 150 new disorders were added.
If you go to the section of the gaming disorder, which is conditions to be considered for future in the DSM-5, in the part they talk about suicidal ideation, they mention nongaming disorder problems, pathological use of Internet.
So they -- it is implied. It is there. But it's -- and it may be in the future versions of the DSM.
BY MR. DAVIS:
Q. Okay. Just try to stay with my question, Dr. Mojtabai. I know you're trying to help, but...
There's no diagnostic criteria for social media addiction that has been formally accepted or recognized by any psychiatric organization, true?
MS. EMMEL: Objection, asked

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and answered, vague.
A. To my knowledge, no.
BY MR. DAVIS:
Q. Would you agree that there's not even general consensus about what criteria should or should not be included within what you call social media addiction?
MS. EMMEL: Objection, vague and ambiguous, compound.
A. I believe there is quite a bit of consensus about what should be included in those criteria.
BY MR. DAVIS:
Q. Okay. And what's the basis? What source are you referring to?
A. I'm referring to what's published regarding Bergen Instruments -- Social Media Addiction Scale, and even I saw a paper published by Chen that was media -- I think it's -- they work for Meta, using Meta data, and they are proposing some criteria that have overlapped with the Bergen, with the addiction, with the Social Media Addiction Scale.
So there is quite a bit of

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overlap.
Q. There's no consensus yet, no agreement upon professionals about what diagnostic criteria should or should not be included in social media addiction, right?
MS. EMMEL: Objection, vague and ambiguous.
A. Yeah, I don't know what that means, what consensus among professionals. There are people who look at the evidence and believe that there is quite a bit of overlap, and there is consensus that loss of control, overuse, salience, preoccupation with the device, giving up activities, other activities, essential activities of life.
These are elements of addictive use that are common across these different instruments and different definitions that have been proposed.
BY MR. DAVIS:
Q. There is debate within the scientific community about whether or not social media addiction is a real diagnosis, right?
MS. EMMEL: Objection, asked

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and answered, vague.
A. There's debate about everything in scientific community. That's the whole point of science. People talk. We have new literature coming, new studies coming supporting points, and that is how each one of those disorders that are included in DSM-5 and ICD-11, they're added, by -- not everybody agreed, not everybody still agrees on some of those definitions, but it's based on the accumulated evidence over time.
BY MR. DAVIS:
Q. Yeah, I'm not asking about something general.
A. I know.
Q. I'm very specific in my question, which is: There is debate within the scientific community about whether or not social media addiction is a real diagnosis or not, true?
MS. EMMEL: Objection, asked and answered, vague.
A. The majority of people who work on social media -- problematic use of social media research, I would say in psychology/

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psychiatry-related fields, epidemiology, they would agree that there is a construct of problematic use of social media that includes those elements I was mentioning.
BY MR. DAVIS:
Q. Yeah. There are people who believe that social media addiction exists and there's people, scientists in the field, who believe it doesn't exist, right? It hasn't been established, right?
MS. EMMEL: Objection, asked and answered.
A. I believe there is a minority that still may argue about the existence. There might be some debate about what specific criteria are included, but there is a majority who believe that there is such a construct.
BY MR. DAVIS:
Q. The Bergen Social Media Addiction Scale or variations of it --
A. Yeah.
Q. -- or other scales on social media addiction, those have not undergone, to your knowledge, any clinical trial studies to

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determine whether or not they are valid, right?
A. Oh, there is a meta-analysis, actually recently to 2025, by Bottaro and colleagues, they looked at 28 validations that is of the Bergen, and they're all very -- very supportive of the validity. They validate it against different disorders, they validate it against different scales.
Q. The meta-analysis is not -- or were not comprised of randomized controlled trials for the purpose of determining whether or not social media addiction can be diagnosed using the Bergen addiction scale or something similar to it, right?
MS. EMMEL: Objection, vague and ambiguous, compound, foundation.
A. I have to clarify. To validate a scale, you do not engage in randomized controlled trials.
BY MR. DAVIS:
Q. I'm not asking you that question, Dr. Mojtabai. You've got to hang with me on the question, okay. Focus on my question.

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The meta-analysis that you mentioned was not comprised of randomized controlled trials for the purpose of determining whether or not social media addiction can be diagnosed using the Bergen addiction scale or something similar to it, right?
MS. EMMEL: Objection, asked and answered, foundation.
A. The question has several problems. The question you say randomized controlled trials were not utilized to validate this --
BY MR. DAVIS:
Q. I haven't asked that. I haven't asked -- you've got to focus -- you have -- stay with my question.
A. Okay.
Q. The meta-analysis that you mentioned was not comprised of randomized controlled trials for the purpose of determining whether or not social media addiction can be diagnosed using the Bergen addiction scale or something similar to it?
MS. EMMEL: Objection, asked

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and answered.
Counsel, he's answered this three times now.
MR. DAVIS: He's not. He's not answered it yet.
A. The purpose -- the word "purpose" you put in in that question, that is misspecified. That's misstated.
The purpose -- randomized controlled trials are not used for the purpose of what you are describing as clinical validation of the scale.
BY MR. DAVIS:
Q. I haven't asked about clinical validation.
Something can be -- there's a -- the Bergen screening tool and other screening tools like it are screening tools. They're not diagnostic, right?
A. They are used for screening for what?
Q. Well, I think you -- I'm asking you a very straightforward question.
The Bergen addiction --
A. Right.

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Q. -- scale and others like it, they're not used in clinical work to make a diagnosis, right?
A. Well, since there is no -- I should clarify, because you mentioned screening. Screening is used when you have a disorder, like, let's say hypertension, and you use a screening measure to capture it.
Bergen and other scales are in some ways measures of the construct of problematic use of social media or addictive use of social media.
Q. The Bergen addiction scale and others like it are not used in clinical research for purposes of making a diagnosis, right?
MS. EMMEL: Counsel, this has been asked and answered. It's harassing at this point.
A. We talked about that. There is -- when you say diagnosis, are you talking about the DSM diagnosis?
BY MR. DAVIS:
Q. Yes.
A. I think I answered that

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question. There's no DSM category of social media addiction.
Q. Right. The Bergen addiction scale and others like it --
A. Right.
Q. -- have not been used to make diagnoses of patients on whether or not they're addicted to social media, right?
MS. EMMEL: Objection, asked and answered.
A. Some of those studies actually might have used them in a clinical setting to identify patients who have problematic use of social media.
BY MR. DAVIS:
Q. The Bergen addiction scale and others like it identified patients who may or may not have what you call social media addiction, right?
A. Well, if they don't have it, they would not score high on the -- so you're saying is it a valid measure or is it not a valid measure? Has validity been established against other scales or conditions?
Q. The Bergen addiction scale and

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others like it are not used in clinical practice to diagnose patients with what you call social media addiction, right?
MS. EMMEL: Objection, asked and answered.
A. So I -- yeah, I think I did answer it. There is no disorder named social media disorder in the DSM-5. So if you are -- when you say diagnose, are you referring to make a determination of something that doesn't exist? It doesn't exist in the DSM-5.
BY MR. DAVIS:
Q. Right.
A. But is there such a thing, a clinical problem, and is the Bergen scale used to identify patients who have that problem, that's a different question.
Q. Are you aware of anyone on your own personal knowledge who has used the Bergen addiction scale or something like it to make an assessment of whether someone is addicted to social media?
MS. EMMEL: Objection, asked and answered.

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A. So I should say -- when you say personal, is it do I know the person like personally?
BY MR. DAVIS:
Q. Yes.
A. I'm interacting with that person?
Q. Yes.
A. I don't interact with many child mental health providers, so I can't really, you know, put my finger and say, well, John does use it, or Jill.
Q. You're not aware of anybody who uses the Bergen addiction scale or something like it to make a diagnosis of what you call social media addiction, fair?
MS. EMMEL: Objection, asked and answered, harassing.
A. I have seen studies of people reporting when using Bergen in their practice to make this identification.
BY MR. DAVIS:
Q. I'm talking about -- focus on my question, Dr. Mojtabai.
You're not aware of anyone in

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clinical practice who uses the Bergen addiction scale to make an assessment of whether someone is -- falls into the category of what you call social media addiction, right?
A. You change --
MS. EMMEL: Objection, asked and answered, harassing.
A. Yeah, I think the question -- you said are you aware of, do you know the person in person? So those are different things.
I'm aware of, based on my reading of the literature.
BY MR. DAVIS:
Q. I'm talking -- I'm asking about are you aware -- you have to please listen to my question.
A. Yes.
Q. Are you aware of anyone in clinical practice that's using the Bergen addiction scale or something like it to make a diagnosis of something that you call social media addiction?
MS. EMMEL: Objection,

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harassing. This is the third time the exact question has been asked and answered.
A. Right. And I'm going to answer the same way: I'm aware, by reading literature, that there are clinicians who -- and researchers who use Bergen in clinical settings for identifying people with problematic social media use.
BY MR. DAVIS:
Q. The people you're talking about are involved in clinical research studies, right?
A. Those who publish are involved in clinical research studies, by definition.
Q. Do you, Ramin Mojtabai, know of any clinician that you work with, that you know, who is actually using the Bergen addiction scale or something like it to make a diagnosis of social media addiction?
MS. EMMEL: Objection, harassing, asked and answered for the fourth time.
A. Yeah, I'm not a child psychiatrist or child psychologist. I don't

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interact with them a lot, so I don't -- I'm not aware of people who, in their practice, mainly work with children and adolescents.
BY MR. DAVIS:
Q. And you're not aware of someone in the adult situation who you have personal knowledge of that's using the Bergen addiction scale or something similar to it to make a diagnosis of social media addiction, are you?
MS. EMMEL: Objection, asked and answered, harassing.
A. Again, in my personal -- in my limited clinical encounters, I don't know anybody personally, individually, who is using that.
BY MR. DAVIS:
Q. You've never used it in that way, have you?
A. I have to think about it, because it's -- I have vague memory, as I mentioned, in my practice, I have seen people with mental health problems that social media use was a contributing factor. So I have asked questions related or from the Bergen

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probably in those cases.
Q. I'm not asking whether you've asked questions that may be similar to the Bergen.
I'm actually asking you, have you, Dr. Mojtabai, used the Bergen addiction scale or something similar to make an assessment of whether someone is addicted to social media, in your clinical practice?
MS. EMMEL: Objection, asked and answered.
A. I don't have a recollection of that.
BY MR. DAVIS:
Q. Do you agree that there are tens of millions of individuals who use social media daily without experiencing any of the mental health outcomes that you outline in your report?
MS. EMMEL: Objection, foundation.
A. Yeah.
BY MR. DAVIS:
Q. Do you agree that there are tens of millions of individuals who use

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social media daily without experiencing what you call social media addiction?
MS. EMMEL: Objection, foundation, vague.
A. The answer is -- has two prongs. There are also thousands and hundreds of thousands of people who have different degrees of social media problems.
BY MR. DAVIS:
Q. Yeah. Just -- let's stick with my question.
Do you agree that there are tens of millions of people who use social media use daily without developing what you call social media addiction?
MS. EMMEL: Objection, vague.
A. That is probably true, yeah.
BY MR. DAVIS:
Q. And if you look at page 22 of your report, up at the top -- top of the page --
A. Right.
Q. -- it says: --
MS. EMMEL: Again, Counsel, are you referring to the -- the April

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report or the May report?
THE WITNESS: Yeah.
BY MR. DAVIS:
Q. Dr. Mojtabai, are you with me? Are you with me? You're on page 22 of your report -- of your report marked as Exhibit 5?
A. Exhibit 5, yeah. Yeah.
Q. Okay. You say at the top of the page: While data indicate that many adolescents spend large amounts of time on social media, not all can be considered problematic users.
Did I read that correctly?
A. I think what you read may -- which version are you reading?
So what I read is: While data indicate that many adolescents nowadays spend large amounts of time on social media, not all of these adolescents can be considered as problematic user.
Is that the sentence that you read?
Q. Yes, sir.
And so you agree that spending large amounts of time on social media or

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being engaged with social media for large amounts of time is not alone sufficient to make a diagnosis of what you call social media addiction, right?
MS. EMMEL: Objection, compound, foundation.
A. So again, it may, if they're spending all their waking hours on social media, not doing anything else, not being able to give up the app, not sleeping enough.
BY MR. DAVIS:
Q. I'm focused solely on amount of time and engagement.
A. Yeah, the time can be the whole -- as I mentioned, if they spend their whole waking hours, I would still consider it a problematic -- a type of problematic or maladaptive use of social media.
Q. So amount of time alone on social media is enough for you to make a diagnosis of social media addiction?
MS. EMMEL: Objection, foundation, misstates testimony.
A. Again, I don't -- it's not a diagnosis. I think we established that.

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It's not a diagnosis in DSM, and I don't think I anywhere talk about a diagnosis of social media in -- social media addiction in my report.

I talk about problematic use or addictive use, or if I mention it, addiction. It's not necessarily a diagnosis.

BY MR. DAVIS:

Q. Is time alone sufficient for you to conclude that someone has social media addiction?

MS. EMMEL: Objection, vague, compound.

A. Going back to what I said. If they spend all their waking hours -- and there are kids who do that apparently -- then I would be very concerned that there is other problems that are --

BY MR. DAVIS:

Q. No, not that you're concerned.

A. Yeah.

Q. You've got to focus on my question.

Not that you're concerned, but is time -- or engagement alone, for a large

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number of hours, sufficient by itself for you to say that someone is -- has social media addiction?

MS. EMMEL: Objection, vague, compound, asked and answered.

A. So again, going back to what I said, if the whole waking hours of the adolescent is spent on social media, that means that a lot of the other criteria are also met, other factors that we consider, other features we include.

Like foregoing other activities, not being able to control their behavior, impact on -- on work and school and relationships, having difficulty -- sort of dependence on the measures.

So these are indicative of that problem, and some of them are actually including that problem. If the child is on the app all the time, they can't go to -- they can't take care of their homework.

BY MR. DAVIS:

Q. But I'm saying you don't know any of that information. All you know is the number of hours that someone is spending on

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social media.

A. Yeah.

Q. Is that number of hours alone sufficient for you to say that that person has what you call social media addiction?

MS. EMMEL: Objection, incomplete hypothesis, vague, compound.

A. I have to ask what other problems, and especially things that would be affected if the child is spending all of their time on this -- on the app.

BY MR. DAVIS:

Q. Now, to make a diagnosis of addiction, that involves a clinical evaluation and an interview, right?

A. Addiction -- can you define addiction? We don't have addiction in DSM-5.

Q. Well, you talked about in your report behavioral addictions, right?

A. Right. Well, yeah, that's one way of describing them. But they're all called disorders in the DSM-5.

Q. To make a diagnosis of a substance abuse disorder, right --

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A. Okay.

Q. -- or a behavioral disorder, you have to have a clinical interview and an evaluation of the patient, right?

MS. EMMEL: Objection, compound.

A. For a diagnosis, yes, it is the same.

BY MR. DAVIS:

Q. Are you aware of any study with respect to social media where there was a clinical evaluation and an interview to make a diagnosis of a study participant?

MS. EMMEL: Objection, vague, compound.

A. Diagnosis of what? Can you -- diagnosis -- diagnosis means a disorder identified.

BY MR. DAVIS:

Q. Right.

So is it your view that social media addiction is not a diagnosis?

A. I believe it's a problematic behavioral construct.

Q. Does it rise to the level of a

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diagnosis?
A. Diagnosis in the DSM or...
Q. Any diagnosis.
A. What is the -- again, that's a very broad question.
Q. Do you make diagnoses of psychiatric disorders which are not identified in the DSM?
A. I have, yes.
Q. Okay. And so my question to you is: With that in mind, is it your view that social media addiction is a diagnosis or is it not a diagnosis?
MS. EMMEL: Objection, vague.
A. So your question is that -- does it qualify, does it impair the person to the same extent as some of the disorders that are in DSM and does it cause as much distress.
Those are the two major criteria we consider whether a disorder is a pathological -- it's a condition that is -- that meets the -- I'd say criteria, mental criteria for a disorder.
So if it is causing disability,

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impairment in functioning, and distress, yes.
BY MR. DAVIS:
Q. So in your mind, does social media addiction cause or result in those two impairments that you identified?
MS. EMMEL: Objection, vague, calls for speculation.
A. It's my opinion based on readings that some of those people who have major issues with social media -- problematic use of social media would be distressed or disabled to an extent that is considered pathological.
BY MR. DAVIS:
Q. Okay. So with that in mind, is there any study that assessed study participants' use of social media where they were able to do a clinical interview and evaluation to determine that they had disability, an impairment in functioning and distress?
MS. EMMEL: Objection, vague, vague and ambiguous, compound, requires speculation.
A. So since most studies use

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scales, I'm aware of numerous studies that have looked at the association of social media problems with problems in other areas.
One of the criteria of Bergen, if you look at it, is actually the impairment it causes in workers who -- so it is implicit in the criteria and the construct that it is impairing and it is distressful, and other measures that you use for measuring distress and impairment are also confirming that.
MR. DAVIS: I move to strike as nonresponsive.
BY MR. DAVIS:
Q. Dr. Mojtabai, can you identify a single study that's either experimental or longitudinal where there was a clinical evaluation done of study participants to assess them under the Bergen addiction scale or some other similar scale?
MS. EMMEL: Objection, vague and ambiguous, compound.
A. Yeah, I have to go through each one of the studies that I have reported. But as I mentioned, there is compelling evidence that the problematic use of social media is

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associated with significant impairment and distress.
And it's not common for epidemiological studies to have a clinical evaluator to evaluate or diagnose patients. I mean, that is not a common practice.
We use measure -- even in clinical settings for establishing disability and impairment, for example, we use GAF score, which is a scale. These scales have been evaluated and they're reflective of impairment and distress.
MR. DAVIS: Sorry, that's not the answer to my question. I move to strike as nonresponsive.
BY MR. DAVIS:
Q. Can you identify a single study that's either experimental or longitudinal where there was a clinical evaluation done of study participants to assess them under the Bergen addiction scale or some other similar scale?
MS. EMMEL: Objection, compound, vague and ambiguous.
A. Again, I -- if I go through the

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list, I'm sure I would identify studies that have looked at impairment and distress, as we mentioned, or --
BY MR. DAVIS:
Q. I'm asking specifically about a clinical evaluation. Can you identify any such study sitting here today?
MS. EMMEL: Same objections.
A. Yeah, clinical evaluations is -- is not a -- it's not clear in my mind what is a clinical evaluation means even. Is it having a psychiatrist evaluate people?
BY MR. DAVIS:
Q. Let me ask you the question again so you have it fresh in your mind, okay.
A. Okay.
Q. I think it's clear, but I'll ask it again.
Can you identify a single study that's either experimental or longitudinal where there was a clinical evaluation done by a trained professional where the study participants were assessed in a clinical evaluation using the Bergen addiction scale

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or some other similar scale?
MS. EMMEL: Objection, vague and ambiguous, compound.
A. So Bergen is often used as a self-report.
I think the premise of this question is -- is somewhat unclear. It's not a clinical interview. It's not SCID. It's not CIDI. It's not built to be used in a clinical setting as an evaluation form. It is, as you mentioned, a screening instrument.
BY MR. DAVIS:
Q. Thank you.
Let's turn to -- real quickly, dopamine, the release of dopamine --
A. Yes.
Q. -- happens anytime there's a pleasurable activity or even the anticipation of a pleasurable activity, right?
A. Right.
Q. So you and I may be releasing dopamine right now as we have this conversation during this deposition, right?
A. About you, I'm not sure. But myself, I'm sure I'm not.

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Q. Okay. Well, when you read it -- well, when people read a good book or they see a good movie --
A. Right.
Q. -- that releases dopamine, right?
A. Correct.
Q. And if they're talking with friends or e-mailing or texting friends or family or coworkers or classmates, that can release dopamine, right?
A. It could.
Q. Right.
And you understand that every form of communication --
A. Right.
Q. -- whether digital or nondigital, can give a dopamine release, right?
MS. EMMEL: Objection, compound.
A. Every form of it? Well, if it is pleasurable, as you said.
BY MR. DAVIS:
Q. Yes.

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A. Yeah, if it is pleasurable, that's a pleasure neurotransmitter.
Q. And you're not aware of any studies in humans that show that the release of dopamine is more when social media use occurs than some other form of communication, are you?
MS. EMMEL: Objection, vague.
A. Can you repeat the question? I'm sorry.
BY MR. DAVIS:
Q. Are you aware of any study that has determined the amount of release of dopamine that occurs in humans from using social media versus any other form of communication or entertainment?
MS. EMMEL: Objection, vague.
A. I'm not sure that they have the studies that -- some of them I referred to here have compared social media use specifically with another type of pleasurable activity.
BY MR. DAVIS:
Q. You're not aware of any evidence that the use of social media causes

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more dopamine to be released or more intense form of dopamine to be released in humans, are you?

MS. EMMEL: Objection, vague, compound.

A. I'm aware of studies that look at differential patterns of activation of dopaminergic systems in the brain among people with problematic use of social media and those who are not problematic users.

BY MR. DAVIS:

Q. You're talking about the fMRI studies that you reference in your report?

A. Right.

Q. None of those fMRI studies determine whether or not there's some pathologic disorder that the person has as a result of release of dopamine or the brain activity that's shown on the fMRI, true?

MS. EMMEL: Objection, vague and ambiguous, compound.

A. I don't know what pathological in this context means, but there are similarities between activation of different brain centers in people with problematic use

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of social media and those who use substances.

BY MR. DAVIS:

Q. None of the fMRI studies that you mention in your report determine that the person, when the brain activity happens or the dopamine release happens, actually shows that they have a psychiatric disorder as a result of that brain activity or that dopamine release, right?

MS. EMMEL: Objection, vague and ambiguous, compound.

A. So, yeah, this question is a bit ambiguous. I tell you why. Because I don't think we even to this day have a fMRI signature of specific mental disorders that we could base a diagnosis on.

So -- but I understand we have an expert on fMRI who knows more and she does this type of research --

BY MR. DAVIS:

Q. Okay.

A. -- regularly who can answer this question better than I.

Q. Okay. So you're not aware of a way to look at an fMRI study and to make --

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based upon just the findings on the fMRI study, to link it up with some psychiatric disorder in patients, are you?

A. Link it up is different than diagnose patients --

Q. Let me rephrase it.

You're not aware of a way today to establish a diagnosis of a psychiatric disorder in a patient based upon what is seen on fMRI?

MS. EMMEL: Objection, speculation, vague.

A. Yeah, I don't think I talk in my report or have done an extensive review of that. That was not in the purview of my report, to look at that.

And that research is also, like social media, very fast moving, so --

BY MR. DAVIS:

Q. I'm just --

A. -- I cannot speculate on that.

Q. Yeah. I'm just saying, are you aware of a way today to establish a diagnosis of a psychiatric disorder in a patient based upon what is seen in an fMRI result?

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MS. EMMEL: Objection, vague.

A. As I said, I haven't done an extensive recent review, and I wouldn't speculate on something that I don't -- that I haven't reviewed.

BY MR. DAVIS:

Q. Now, look at page 7 of your report, Dr. Mojtabai.

MS. EMMEL: For clarification, is this the April version of the report?

BY MR. DAVIS:

Q. If you can turn to paragraph number 4 -- it has number 4, there's a section called Temporality.

Do you see that?

A. I see that.

Q. And you write: Temporality is probably the oldest and best-known criterion for causality.

Is that right?

A. Right.

Q. Right.

And you even say later on: It is impossible to imagine a causal

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relationship where the cause does not precede the outcome in time.
Right?
A. Yes.
Q. Okay. And that's really what temporality is. It is establishing that the exposure happens before the outcome, right?
MS. EMMEL: Objection, foundation.
A. It is, but I go on to say: However, Hill noted that establishing temporal order may be difficult for slowly developing outcomes.
BY MR. DAVIS:
Q. Sure, I understand that. But not to lose the point, temporality is establishing that the exposure happens before the outcome, right?
A. Correct.
Q. Okay. And it's necessary -- it's a necessary requirement to establish a true association between a claimed cause and a claimed effect, right?
A. None of the criteria that -- he calls them guidelines. None of the

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guidelines that Hill sets out are necessary in those terms. As he says here, it is difficult to establish some of them.
Q. I'm not asking you about Hill's view. I'm asking about your view.
Your view -- do you agree that temporality is a necessary requirement to establish a true association between a claimed cause and a claimed effect?
A. Again, I say it's not necessary, and I can give you examples if you want.
Q. So, for example, is it your opinion that you don't have to establish that social media use occurs -- strike that.
Is it your opinion that temporality doesn't have to be established in the studies that you assess for whether or not social media use causes any of the mental health outcomes that you identified in your reports?
MS. EMMEL: Objection, vague, compound.
A. So can you repeat your question? Because it has several --

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BY MR. DAVIS:
Q. Is it your opinion that temporality does not have to be established in the studies that you assessed for whether or not social media use causes any of the mental health outcomes that you identified in your reports?
MS. EMMEL: Objection, vague, compound.
A. So I have -- the issue I have is with the implied part, and you -- the question implies that temporality has to be established in every study.
BY MR. DAVIS:
Q. I'm asking you, does it have to be established in every study?
A. No, it doesn't.
Q. Okay. So if you use a study --
A. Yeah.
Q. -- that does -- let me strike that.
If you use a study in your report for a causal assessment that doesn't establish temporality, you still use that study to make a causal assessment?

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A. Again, causal assessment is -- all of these studies, there are hundreds of studies here. They all contribute pieces to the puzzle. And some of them are cross-sectional, it might very difficult to establish causality.
As Hill says, some of the causes are very slow to develop. Some of the causes you even don't have to establish. I'll give you an example of sex in this study.
Sex is clearly preceding any outcome, so if it's associated with --
Q. I'm listening.
A. If it's associated with some mental health outcome, we can unambiguously say that it is related causally to that outcome.
(Whereupon, Mojtabai-6, Pyramid of Evidence, was marked for identification.)
BY MR. DAVIS:
Q. Dr. Mojtabai, this is Exhibit 6.
A. Right.

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Q. And this is a figure -- what's in Exhibit 6 is Figure 3 taken from your report, right?
A. Correct.
Q. And what you did is for the figure that we have on Exhibit 3 is called the Pyramid of evidence, right?
A. Right.
Q. Is that right?
A. Correct.
Q. Okay. And in this pyramid, what you did is you ranked different type of study designs from lowest quality on the bottom of the pyramid to the highest quality to top the pyramid, right?
A. Yes.
Q. And you say that -- in your report, that: Researchers generally agree on a ranking of research designs based on the vulnerability of these studies to confounding.
Right?
A. Correct.
Q. And that's how you ranked these different studies in your pyramid of

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evidence, right?
MS. EMMEL: Objection, foundation.
A. Right.
BY MR. DAVIS:
Q. And at the bottom of the pyramid is Expert Opinion/Expert Consensus.
Correct?
A. Yes.
Q. That is the form of evidence that is most prone to confounding, and thus, is potentially biased, correct?
A. Potentially.
Q. Okay. And the type of scientific data above that is called case series and case reports, right?
A. Correct.
Q. And case reports and case series are not controlled studies, are they?
MS. EMMEL: Objection, compound.
A. By controlled, what do you mean? I'm sorry.
BY MR. DAVIS:
Q. That there's a control group.

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A. No, there is no control group. All case -- you could have -- I can think of case series that might have a control group, but typically they don't.
Q. Case reports and case series can be selectively reported?
A. Right.
Q. And the investigators could have biases about why they chose to report them, right?
MS. EMMEL: Objection, compound.
A. Correct.
BY MR. DAVIS:
Q. And case series and case reports also do not assess potential confounders that could be causal, correct?
MS. EMMEL: Objection, compound.
A. Correct.
BY MR. DAVIS:
Q. And case series and case reports generally and typically raise questions or hypotheses, but they don't answer them, right?

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MS. EMMEL: Objection, vague.
A. Well, typically that's the case.
BY MR. DAVIS:
Q. And typically, the cases the case reports or case series don't establish causation, right?
MS. EMMEL: Objection, vague and ambiguous.
A. I have to qualify this, because there are case series that raise significant causal questions or even try to answer them. And I can give you examples if you want.
BY MR. DAVIS:
Q. You're talking about a situation like a rare exposure or a common exposure such as like -- like thalidomide, where there's a specific outcome that's resulting from a specific exposure, right?
A. Or antidepressant use in adolescents and suicidal ideations. It was based on the case series and ended up actually going to FDA, end up being on -- a black box warning on antidepressants.
Now you open any antidepressant

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medication insert and it says it is dangerous for children and adolescents. Consider that.
Q. Dr. Mojtabai, you're not suggesting that the black box warning that went into effect with --
A. Antidepressants.
Q. -- with antidepressants was based on case series or case reports, are you?
A. No, but it started that.
Q. No, no. You understand that what the FDA looked at was controlled studies that had been submitted to it and made an assessment to change the labeling, right?
MS. EMMEL: Objection, foundation.
A. After the case series came out.
MS. EMMEL: Speculation.
BY MR. DAVIS:
Q. The FDA made its decision about the black box warning based upon the controlled studies, not on the case series, right?
MS. EMMEL: Objection, foundation, speculation.

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A. As I said --
MS. EMMEL: Just give me a chance to get my objection in.
Foundation, speculation.
A. The study that came out, case series studies, is pretty famous in epidemiology, was motivation for everything else that happened after that, including FDA going back to all the studies that were submitted to them to look at the --
BY MR. DAVIS:
Q. What case series are you talking about?
A. The study by Cole. It's actually in the American Journal of Psychiatry I think in 1990.
Q. Well, wait a minute.
The black box warning went into effect in April of 2004, right?
A. Yeah.
MS. EMMEL: Objection, relevance.
BY MR. DAVIS:
Q. You're talking about something that happened in 1990, right?

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A. It started it. Everything moves very slowly in research.
MS. EMMEL: Object to relevance of this line of questioning.
BY MR. DAVIS:
Q. All right. Dr. Mojtabai, ecological studies measure both exposure and outcomes at the group level and not at the individual level, right?
A. Yeah, that's correct.
Q. And ecological studies track groups of people over time, right?
A. Ecological studies do not necessarily track people over time. They could be geographical.
Q. Okay.
A. Studies talking about suicide in adolescents and antidepressants, there are ecological studies that look at different counties in the country.
Q. Sure.
But in that situation, again, the ecological studies are tracking groups of people, right?
A. Tracking over time, you mean?

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Q. Just tracking them. They are assessing groups of people?
A. Assessing, yes.
MS. EMMEL: Objection, vague.
BY MR. DAVIS:
Q. And ecological studies or surveys do not follow individual patients over time, right?
A. Ecological studies do not --
Q. For example, Monitoring the Future, Youth Risk Behavior Surveillance, UK Millennium survey, those are not tracking individual patients over time, but rather, groups of patients over time, right?
A. No.
MS. EMMEL: Objection, compound.
A. That's wrong. These are individual surveys. These are not ecological studies. You may use them -- again, you can use data to do ecological studies. You could use individual-level data, put them in bins geographically, put them in longitudinal studies and then look at them ecologically, you could do that.

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But those surveys you mentioned, these are individual participant surveys, youth --
BY MR. DAVIS:
Q. Yeah, but what's happening, for example, with the Monitoring the Future or the Youth Risk Behavior Surveillance is they're assessing group -- one group in one year and another group in the second year, right?
MS. EMMEL: Objection, compound, vague, speculation.
A. That's not ecological. If you're --
BY MR. DAVIS:
Q. I'm not asking you whether it is. I'm just asking you if that's what they do.
A. Well, you started the question with "ecological." This is a different -- it's mixing survey data --
Q. It's not important. It's not important.
(Simultaneous discussion interrupted by the stenographer.)

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MR. DAVIS: It's not important.
BY MR. DAVIS:
Q. Surveys do not have a control group, do they?
A. So again, control group is not inherently something different. You could do a case-controlled study nested within a survey. You could do a cohort study nested within a survey so you would have people who are exposed and not exposed.
And so that nonexposed group is equivalent to control group you're talking about.
Q. Let me give you an example so we're on the same page of what survey we're talking about.
A. Okay.
Q. There are customer service surveys that companies do, right, when they reach out to customers and they ask them about their experience with the product or their service, right?
A. Right.
Q. Those are not -- they don't have a control group, do they?

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A. I'm not familiar with customer service. I don't know if they do or not.
Q. You agree that ecological surveys and -- excuse me. Strike that.
Ecological studies and surveys do not establish temporality, do they?
A. Again, I said -- as I said, within a survey, you could have a case control or a cohort, and cohorts could be, actually, looking at the same people over time.
Q. Yeah. And I'm not asking about a cohort study. I'm asking about an ecological study, right?
An ecological study and a survey does not establish temporality, does it?
A. Well, you're saying ecological study and survey so --
Q. I'll break it up for you. Ecological studies do not establish temporality, do they?
A. Ecological studies could establish temporality at a different level. It's not individual level. It's a group

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level. You could establish that.
So I can give -- do you want examples --
Q. No, that's fine. No, I've got an answer. Thank you.
Ecological studies do not establish temporality at the individual level, fair?
A. Correct. Yes.
Q. Okay. Customer surveys, to your knowledge, don't establish temporality, do they?
A. I don't -- I'm not familiar with customer surveys, if they -- if they're done over time, so the product is introduced, the customer survey is done one time. Then next time they establish temporality, again, at the customer level.
Q. They establish temporality based upon self-report, right?
A. It might be patterns of -- I mean, I'm just -- I shouldn't be speculating really. I haven't done any customer surveys.
Q. Okay. Ecological studies can't distinguish between correlation and

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causation, can they?
MS. EMMEL: Objection, vague.
A. So, first of all, every causation involves correlation. This is one thing. And different studies contribute different degrees of evidence to support causation.
So a well-designed ecological study, I would say, is -- contributes to causal knowledge.
BY MR. DAVIS:
Q. Yeah. I'm not asking that question, though.
My question simply is that: Ecological studies can't distinguish between correlation and causation, can they?
MS. EMMEL: Objection, vague.
A. I have to think about it.
So -- so they could imply causation to the extent that confounding factors can be considered.
BY MR. DAVIS:
Q. Okay. Ecological studies can imply causation, but that may not be a valid assessment of the causation, fair?

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MS. EMMEL: Objection, vague, speculation.
A. Yeah, I would -- I would say that for any study there is that risk. Any research study, there is that risk, the issue of validity, you're saying.
So the different -- that's why we have criteria and that's why we have different -- the pyramid. The pyramid doesn't mean that some of them are out of the pyramid. They're still in the pyramid.
BY MR. DAVIS:
Q. If you had only ecological studies --
A. Right.
Q. -- could you establish causation?
MS. EMMEL: Objection, speculation.
A. It is suggestive -- I have to see the ecological studies. Some of the ecological studies could be at the level of granularity that support causation.
So let's say that level is household or it's a neighborhood. So in that

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case, I would -- the level of -- that's different than a county or state or a country.
So ecological studies are also different --
BY MR. DAVIS:
Q. If you -- yeah. If you had only ecological studies, could you establish causation at the individual level?
MS. EMMEL: Objection, asked and answered.
A. I'm going to -- again, "establish" is a very strong word. Establish means what? Can you...
BY MR. DAVIS:
Q. If you only had ecological studies to look at, could you determine causation at the individual level?
A. Typically, no.
Q. Okay. Next section you've got are -- above case series and case reports are cross-sectional and case-control studies, right?
A. Right.
Q. Now, cross-sectional studies

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measure two or more variables at one time point and examine the association of those variables at that one time point, right?
A. Correct.
Q. And you put in your report that if A and B are related in a cross-sectional study, it is equally possible that A causes B, B causes A, or the relationship is reciprocal.
Correct?
A. Correct.
Q. And by that, you mean that you don't know which one is more likely to be occurring, right?
A. That's what it implies, yes.
Q. Okay. And a cross-sectional study can establish correlations, but it cannot determine if there's a valid association, true?
A. Valid association? Correlation is a valid association.
Q. Well, there are associations that are valid and not spurious, right?
MS. EMMEL: Objection, vague.
A. "Spurious" is a very broad

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term. You mean confounded by a third variable; is that -- I shouldn't say what you mean, but you may mean --

BY MR. DAVIS:

Q. Well, you're taking -- let's be clear.

Cross-sectional studies don't establish whether or not the exposure happens before the outcome being studied, right?

A. Sometimes they do. As I mentioned the example of sex, genetics is another example, race is another. There are -- cross-sectional studies with those variables in the model are very strong causal -- you can draw a causal inference from that.

Q. Is it fair to say that with respect to social media studies that you evaluated, those don't establish whether or not the social media use occurred before or after the outcome with respect to the cross-sectional studies?

A. The ones that I have looked at may not have -- I have to think about all of them. There are huge numbers of social media

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cross-sectional studies, and some of them ask about the timing of social media use.

Q. You yourself have said that cross-sectional studies cannot be used for a causal inference, right?

A. I have said those words?

Q. You've said those words, haven't you?

MS. EMMEL: Objection, vague.

A. I do not recall. They cannot be used for causal? I don't recall having said...

BY MR. DAVIS:

Q. I'm going to hand you what's been marked as Exhibit 7.

(Whereupon, Mojtabai-7, Problematic social media use and psychological symptoms in adolescents, by Mojtabai, was marked for identification.)

A. Okay. Yes.

BY MR. DAVIS:

Q. This is an article that you coauthored -- that you authored, right?

A. Yes.

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Q. It's titled Problematic Social Media Use and Psychological Symptoms, right?

A. Uh-huh.

Q. And this was published in 2024, right?

A. Correct.

Q. This was the study that you mentioned earlier where you claimed that there was some causal language about social media use in one of your publications, right?

A. Right.

Q. And if you look at this publication, you look at page 7, last sentence before the conclusion --

A. Pages -- I don't see the page numbers. The page numbers...

Q. Go to the last page.

A. Last page? Okay. This one?

Q. Yes. Right above Conclusions.

A. Okay.

Q. You say, quote: Because of the cross-sectional nature of the data, change in adolescents' mental health as a result of change in social media use could not be examined.

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Did I read that correctly?

A. Uh-huh.

Q. That's -- yes?

A. Yes.

Q. You agree that cross-sectional data can't be used to assess whether a change in adolescents' mental health results in a -- is a result of change in social media use, right?

A. So this was multiple cross sections.

Q. Do you agree with that, Doctor?

A. Can you repeat your sentence?

Q. Yeah.

You agree that the cross-sectional nature of the data --

A. Uh-huh.

Q. -- you can't say that the change in adolescent mental health is a result of change in social media use, right?

A. Again, because it's cross-sectional, we cannot establish if they -- if the change -- if let's say adolescents reduce social media use, but if their internalizing symptoms change the same

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degree or if they increase their social media use, their internalizing symptoms increase.

So change here is a different construct than causation you're talking about. It is -- there is causation -- it's between person, really, causation. Is there between person differences, people who are using more social media or more -- have more internalizing symptoms or -- and that's the "within" example, when you look at change within the person in one and its association with change in the other.

So since this is multiple waves of cross-sectional, we can't establish within-person change.

Q. Let's be very clear. You said, in this 2024 publication, that because of the cross-sectional nature of the data --

A. Yes.

Q. -- the change in adolescents' mental health as a result of change in social media use could not be examined.

Did I read that correctly?

A. You read -- you read it correctly, but the context is -- has to be

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considered.

This is talking about change, not talking about causation.

Q. I'm going to get to that in a second, I promise.

A. Okay.

Q. But you agree that you wrote this in 2024 and you stand by your statement, right?

A. Within-person -- this was a cross-sectional study; you cannot establish within-person change.

(Whereupon, Mojtabai-8, Social network, recovery attitudes and internal stigma among those with serious mental illness, by Cullen et al, was marked for identification.)

BY MR. DAVIS:

Q. What's marked as Exhibit 8 is another publication that you authored called Social Network Recovery Attitudes and Internal Stigma Among Those With Serious Mental Illness, right?

A. Right.

Q. And this was published in 2017,

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right?

A. Yes.

Q. And if you look at page 10...

A. The numbers are 400 --

Q. Yeah, if you look at -- I think it's page 457.

A. Yeah.

Q. Left-hand column, first -- excuse me, second full paragraph.

Do you see that?

A. Yes.

Q. This is what you wrote: The study has some limitations. The data are cross-sectional in nature, preventing causal inference.

Did I read that correctly?

A. I'm looking for it. The second paragraph, and which line is it?

Q. It's the second full paragraph, the first two sentences.

A. Okay.

(Sotto voce document review.)

BY MR. DAVIS:

Q. Look at the second full paragraph.

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A. Yes. The majority of participants with disabled -- second full paragraph --

Q. Here, let me help you, Dr. Mojtabai.

A. Yes.

Q. The one right here (indicating).

A. Okay. Full paragraph.

Q. Okay?

A. Okay.

Q. You state in this publication: The study has some limitations.

A. Yeah.

Q. The data are cross-sectional in nature, preventing causal inference.

Right?

A. Yeah, that's what it says.

Q. That's what you said, right?

A. Uh-huh.

Q. And you fully recognize that cross-sectional data prevents causal inference, correct?

A. In this study, I think it did because of the nature of the variables

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with --
Q. Well, let's be clear --
MS. EMMEL: Excuse me, Counsel, he wasn't finished with his question -- or with his answer. I'm sorry.
A. Yeah, it is context dependent. As I was giving the example of some cross-sectional studies, you may actually even infer causation.
BY MR. DAVIS:
Q. You know that virtually every single one of the cross-sectional studies that you rely on -- just let me finish.
A. Yes.
Q. You recognize that almost every single one of the cross-sectional studies that you rely upon has a statement in it saying that cross-sectional studies can't be used for causal inference or they can't know whether or not -- the direction of the association, right?
A. They cannot be the sole basis for causal inference. Most of them can't.
Q. Let's make sure I understand

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what you're saying.
A. Yeah.
Q. You agree that cross-sectional studies cannot be the sole basis of a causal --
A. Correct.
Q. -- determination, right?
A. Sole. Yes.
Q. Okay. If you only had the cross-sectional data --
A. Right.
Q. -- on social media use and adverse mental health outcomes, you couldn't reach a causal determination that social media causes any mental health outcome, fair?
A. There is a qualification. If you have a large number of them -- so first I should go back to this, why we can't base the causal inference on one study is the risk possibility -- it's not definitive. The possibility of confounding.
But if you have a multitude of cross-sectional studies in different contexts done by different people in different countries using different measures, and they

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all tell you the same thing, your level of confidence in causal conclusions from those studies increases.
MR. DAVIS: Okay. Move to strike as nonresponsive. I don't think that was my question, Dr. Mojtabai.
BY MR. DAVIS:
Q. My question simply was this: If you only had cross-sectional data to rely upon, you couldn't form the opinion to a reasonable degree of medical or scientific certainty that social media use causes any mental health outcome, true?
MS. EMMEL: Objection, vague and compound.
A. Again, I go back to this is -- first of all, it is if. It is a hypothetical. And as I mentioned, if you have a large number of cross-sectional studies all telling you the same thing, done by different people, different contexts, different settings, that qualifies the consistency guideline of Hill.
So that supports -- supports a

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causal inference. It supports more than a sole study, than one study.
MR. DAVIS: Move to strike as nonresponsive.
BY MR. DAVIS:
Q. Doctor, please listen closely to my question.
If you only had the cross-sectional data on social media use and adverse mental health outcomes, you could not form an opinion to a reasonable degree of scientific certainty that social media use causes those mental health outcomes, true?
MS. EMMEL: Objection, the question has been asked and answered.
A. Yeah, I think you are proposing a hypothetical situation. I can't imagine a setting -- I mean, I'm speculating.
You have a large number of studies, different settings, different investigators, different countries, done different times, there is a -- and this is all you have to depend your causal inference on -- if the evidence is consistent, it gives me much more evidence than a single study.

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BY MR. DAVIS:
Q. I'm not asking that question, Dr. Mojtabai. I'm going to put it to you again because I think I deserve an answer.
If you only had the cross-sectional data to rely upon about social media use and adverse mental health outcomes, you could not reach an opinion to a reasonable degree of medical or scientific certainty that social media use caused those mental health outcomes, true?
MS. EMMEL: Objection, the question has been asked and answered.
A. Since it's a hypothetical question, I cannot answer.
BY MR. DAVIS:
Q. You -- I'm allowed to ask you hypotheticals, Dr. Mojtabai. Counsel is going to be able to tell you that I'm allowed to ask you hypotheticals.
So with that hypothetical on the table, if you only had the cross-sectional data to rely upon, could you form the opinions to a reasonable degree of medical or scientific certainty that social

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media use causes any of the mental health outcomes you've outlined in your reports?
MS. EMMEL: Objection. It's a hypothetical question, it's been asked and answered.
A. Again, hypothetical means that I can speculate on what I would like to have in those cross-sectional studies. I would have a very large number --
BY MR. DAVIS:
Q. I'm not asking you what you -- what you may have.
A. Right.
Q. I'm asking you what you have in hand today, with the studies that you've relied upon, with the studies that you've looked at that are cross-sectional in nature, if you only had them --
A. Right.
Q. -- could you form an opinion to a reasonable degree of medical or scientific certainty that social media causes those adverse mental health outcomes?
MS. EMMEL: Objection, asked and answered three times, harassing.

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A. So, first of all, this is not -- this opinion, my opinion on causation, is not based only on -- solely on cross-sectional studies.
BY MR. DAVIS:
Q. I haven't asked you that. I haven't asked you that. I'm asking you, look solely at the cross-sectional studies.
Can you form an opinion to a reasonable degree of medical or scientific certainty that social media causes the adverse mental health outcomes that are in your reports?
MS. EMMEL: Objection, asked and answered, harassing.
A. A large number of cross-sectional studies would strengthen my opinion, and added to that, there are longitudinal and --
BY MR. DAVIS:
Q. No, no, Dr. Mojtabai. No, no. I'm not --
MS. EMMEL: Let him answer the question.
MR. DAVIS: No, no, no. He's

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not answering my question.
MS. EMMEL: He is answering your question.
MR. DAVIS: No, he's not and everybody in this room knows he's not.
MS. EMMEL: You can move to strike; that is your option. You have to let him continue with his answers.
MR. DAVIS: No, he's giving me the same nonresponsive answer six times in a row, and I think we all know why, but I'm going to get an answer to this question.
BY MR. DAVIS:
Q. Dr. Mojtabai --
MS. EMMEL: He can clarify the answer to his question if it can't be answered in a yes-or-no manner.
MR. DAVIS: No, no, no. That's not true --
MS. EMMEL: It is, too. He can clarify --
(Simultaneous discussion interrupted by the stenographer.)
MR. DAVIS: I'm going to ask

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you the question. I think I deserve an answer to it.
BY MR. DAVIS:
Q. If you only had the cross-sectional data to rely upon, could you form an opinion to a reasonable degree of medical or scientific certainty that social media use causes the adverse mental health outcomes in your reports?
MS. EMMEL: Objection, asked and answered, harassing.
A. So based on the cross-sectional studies that I have and multiple meta-analyses of those studies that have also conducted meta-regression, which helps to identify potential confounding factors, I would have a stronger opinion than if I had only one single study.
Having had longitudinal and experimental studies further strengthened me -- my opinion.
MR. DAVIS: I move to strike, nonresponsive.
BY MR. DAVIS:
Q. Dr. Mojtabai, I haven't asked

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you about longitudinal. I haven't asked you about experimental. I'm focused solely on the cross-sectional. I'm going to give it one more time and then we're going to get the judge on the line because I deserve an answer to this question.
A. Okay.
Q. Number one, if you only had the cross-sectional data to rely upon, could you form an opinion to a reasonable degree of medical or scientific certainty that social media causes the mental health outcomes in your report?
MS. EMMEL: Objection, hypothetical, asked and answered, harassing.
A. Yeah, I have to see those cross-sectional studies. But generally --
BY MR. DAVIS:
Q. Dr. Mojtabai, you've seen them.
MS. EMMEL: Counsel, you're interrupting his answer.
BY MR. DAVIS:
Q. You've looked at them. You've analyzed them.

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My question to you is: With everything you have in your head today --
A. Yeah.
BY MR. DAVIS:
Q. -- using only cross-sectional data, can you form an opinion to a reasonable degree of medical or scientific certainty that social media use causes or contributes in any way to social -- to the adverse mental health outcomes in your reports?
MS. EMMEL: Objection, asked and answered, harassing. This is the sixth time.
A. So I'm looking at the totality of this data. In my mind, I cannot separate.
So can I base on only experimental studies, for example, make a decision, can I only base my decision on longitudinals. I have difficulty separating in my mind these because I look at the totality of the data.
MR. DAVIS: Move to strike, nonresponsive.
BY MR. DAVIS:
Q. Dr. Mojtabai, so is it your

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opinion that you need the cross-sectional studies in order to form an opinion that social media use causes adverse mental health outcomes?
A. I don't need them, but they contribute --
Q. Okay. You don't need them?
A. -- to my opinion.
Q. So if you only had them, could you form the opinion -- if you only had cross-sectional studies, could you form the opinion that social media use, to a reasonable degree of medical or scientific certainty, causes or contributes to the adverse mental health outcomes in your report?
MS. EMMEL: Counsel, this is the sixth time. Please move on. This is harassment at this point.
A. So I have to -- yeah, this is -- yeah, this is because your definition of cross-sectional is very limited.
I have this study that you mentioned. It's the study of six --
MR. DAVIS: Let's get the judge

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on the phone.
A. -- five waves of cross-sectional data and it's different than one cross-sectional study.
But here he has a study of Facebook rollout in colleges. It is -- you may call it a cross-sectional study, multiple waves. It's different than one cross-sectional study.
So cross-sectional studies are not all one; it doesn't -- one size fits all. So if I have a number of those good cross-sectional studies, multiple waves, large samples -- this is one -- over 1 million, I would be -- and I have only those to make a decision, I would say, more likely than not, that it may meet my criteria.
BY MR. DAVIS:
Q. I'm not asking you may. I'm asking you does it -- can you form the opinion to a reasonable degree of medical and scientific certainty that social media use causes adverse mental health outcomes in your report to a reasonable degree of medical or

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scientific certainty?
MS. EMMEL: Counsel, we're done with this at this point. If you'd like to get the judge on the phone --
MR. DAVIS: We're going to do it. Let's take a break.
MS. EMMEL: You've already asked this question seven or eight times.
MR. DAVIS: Let's take a break. We're going to get the judge on the phone.
THE VIDEOGRAPHER: All right. We're off the record at 12:28 p.m.
MR. DAVIS: No, no, no, stay on the record for a second.
And I'm putting you on notice, too, we're bringing him back, because this is not what we were promised. We were promised answers to direct questions.
These are not difficult questions. These are straightforward questions. We were promised that we would get responsive answers. That's

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in an e-mail to us.
So if you want to -- if you want to have the situation where we're bringing Dr. Mojtabai back, we're going to do it, because these -- this is just ridiculous.
Where there's straightforward questions, I know he knows the answer to these, and what we're getting is a filibuster. And I'm not going to -- we're not going to do that.
MS. EMMEL: He is answering the question --
MR. DAVIS: He's not.
MS. EMMEL: -- in a straightforward manner --
Let me finish.
He cannot answer a yes-or-no question to this particular answer, and he's trying to clarify why not. He is giving you an answer.
MR. DAVIS: No, he's not giving me an answer.
And no disrespect to you.
THE WITNESS: There's none

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taken.
MR. DAVIS: There's a very straightforward answer. I think he knows what the answer is, and he doesn't want to give it.
All right. Let's take a break for lunch.
THE VIDEOGRAPHER: All right. We're off the record at 12:29 p.m. That's the end of Media 3.
(Recess taken, 12:29 p.m. to 1:26 p.m. CDT)
THE VIDEOGRAPHER: We're back on the record at 1:26 p.m. This is the beginning of Media 4.
BY MR. DAVIS:
Q. Dr. Mojtabai, did you have a nice lunch?
A. Yes.
Q. Are you ready to continue?
A. I am.
(Whereupon, Mojtabai-9, Cross-Sectional Studies Cited in Dr. Mojtabai's Expert Report, was marked for identification.)

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BY MR. DAVIS:
Q. All right. I'm going to hand you what's been marked as Exhibit 9.
Do you see that this is a chart of studies that you cite in your expert report and quotes from those studies about the use of cross-sectional data?
MS. EMMEL: Can I also get --
MR. DAVIS: I lost my folder, so I don't know where --
MS. COATES: It's in the other room.
MR. DAVIS: Do you want to go off the record and take a look at that, Jennifer?
MS. EMMEL: Let me just glance at it real quick.
(Document review.)
MS. EMMEL: All right. Go ahead.
(Document review.)
BY MR. DAVIS:
Q. Dr. Mojtabai, do you see that that chart has quotes in it from the studies that are cross-sectional which you rely upon?

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A. I see. I trust they are from the studies. I haven't examined them.
Q. Do you see --
MS. EMMEL: I'd like to make an objection that we did not get a chance to compare those to the actual reports.
BY MR. DAVIS:
Q. Do you see, Dr. Mojtabai, that every one of the studies that I have in that chart would say that for cross-sectional studies, that either causal inferences can't be determined or they're uncertain about which direction the association goes in?
MS. EMMEL: Object to form, vague and compound.
A. I see for individual studies, yes, they -- assuming they -- there's no error in citing, yes.
BY MR. DAVIS:
Q. Well, it's also -- that caveat and that limitation also applies to meta-analyses too, right?
MS. EMMEL: Objection, speculation.

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A. It is -- if it -- well, you can't make generalized statements about meta-analysis, but if there are multiple meta-analyses -- so here is the -- the issue is strength in numbers.
If you have number of meta-analyses, more confidence in the causal inference increases.
BY MR. DAVIS:
Q. Well, you understand that the meta-analyses that you rely upon --
A. Right.
Q. -- that are -- that include cross-sectional data say that causal inferences can't be determined or they don't know which way the association goes between social media use and adverse mental health outcomes or adverse mental health outcomes in social media use, right?
MS. EMMEL: Objection, compound, vague.
A. It determined -- the determination -- determination means there is a night-and-day difference between a relationship that's causal and one that is

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not. Establishing causation is a process based on evidence that accumulates.
BY MR. DAVIS:
Q. Look at page 6 of your report.
A. Page 6. Okay. Yes.
Q. Underneath Section 3.2.
A. Yes.
Q. You say: It is commonly stated that correlation is not the same as causation.
Did I read that correctly?
A. Uh-huh.
Q. Yes?
A. Yes.
Q. That's true, right?
A. That is correct.
Q. Correct.
Another way to say that is an association is not the same as causation, correct?
A. It could be causation. It could be something else, spurious, like they say.
Q. Correct.
So an association may or may

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not be causal, right?
A. May or may not be. That's more accurate.
Q. And that's because, as you say in your expert report, many correlations are incidental or spurious, right?
A. Yeah.
Q. By spurious, you mean inaccurate or not real, right?
MS. EMMEL: Objection, vague.
A. I meant they are confounded, so two things could be related, by A causing, like they say A and B, A causing B, B causing A, or another variable, C, causing both.
BY MR. DAVIS:
Q. Okay. So another way to say that is that an association or correlation, even a statistically significant one, may or may not be causal?
A. If it's only a correlation, yes. I have to qualify that "yes" also. One of the studies that you mentioned is my study. I conducted a LiNGAM analysis, which can, with certain stipulations and assumptions, show the direction of affect,

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but if A is causing B or B causing A, without having the longitudinal or experimental study design.
MR. DAVIS: I'm sorry, move to strike as nonresponsive.
BY MR. DAVIS:
Q. My question simply was, Dr. Mojtabai: Another way to say, is basically, you agree that an association or correlation, even a statistically significant one, may or may not be causal?
MS. EMMEL: Objection, vague.
A. Yeah, that's correct.
BY MR. DAVIS:
Q. Okay. And you also agree that even saying that there's an increased risk, that does not mean there is, in fact, a causal relationship, right?
A. That's the same -- increased risk is a different way of saying there is correlation.
Q. Let me hand you what's been marked as Exhibit 10.
(Whereupon, Mojtabai-10, Excerpt From Reference Manual on

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Scientific Evidence, Third Edition, was marked for identification.)
MS. EMMEL: Could I also get the Exhibit 9?
MR. DAVIS: I don't have it. I don't have an extra copy, but we'll find it.
MS. EMMEL: All right.
BY MR. DAVIS:
Q. Dr. Mojtabai, I've handed you Exhibit 10, which are portions of the Reference Manual on Scientific Evidence.
Do you see that?
A. Yes.
Q. Have you ever seen this before?
A. Looks familiar to me, but --
Q. Is this something that you evaluated and considered in the past?
MS. EMMEL: Objection, vague.
A. I don't recall. Might have been, but I don't recall.
BY MR. DAVIS:
Q. Okay. It's certainly something that you're familiar with, right?
A. Not much, but I have seen it

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referenced or maybe used the reference in some of my work.
Q. If you look at page 560, it says, quote: Cross-sectional studies determine the presence (prevalence) of both exposure and disease in the subjects and do not determine the development of disease or risk of disease (incidence).
Did I read that correctly?
A. Correct.
Q. You agree with that statement, right?
A. I agree with that, yes.
Q. Okay. And cross-sectional studies, I think we've talked about before, are unable to determine the direction by which the association may be going, right?
A. I think I mentioned to you the LiNGAM analysis I did. There are -- there are scenarios where you can use them to get more than just the correlation. You can get the direction of effect from some analysis.
Q. In your 2024 paper that we marked as an exhibit --
A. Yes.

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Q. -- is there anywhere in that paper where you say that your study from 2024 shows a causal effect between social media use and adverse mental health outcomes in adolescents?
A. What I say here, I can quote: LiNGAM analysis supported the direction of effect going from social media use and problematic social media use to psychological symptoms.
Q. Do you say the word "cause" anywhere in that paper?
A. Direction of effect, in my mind, is causation because we talked about A causing B, that's one direction, B causing A, that's another direction, and then C causing both, that's a sort of two directions going between the two.
So directionality of effect is about the same thing as causation.
Q. Right. We know you said in your paper: Because of the cross-sectional nature of the data, change in adolescents' mental health as a result of change in social media use could not be determined.

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Correct?
A. That refers to within-person effects, not between effects.
Q. Well, your -- your 2024 study was cross-sectional. It was not longitudinal, true?
A. It was multiple cross sections, correct.
Q. Right. When you say multiple cross sections, what you're describing is at different points in time --
A. Yes.
Q. -- for each wave, you drew out at the same time the exposure and the outcome, correct?
A. Correct.
Q. Your study was not lagged, was it?
A. No.
Q. Correct.
So what you're describing is at multiple points along the way for your study, you're assessing exposure and outcome at the same time, correct?
A. That is correct.

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Q. Right. That is not a longitudinal study, correct?
A. And that's why I couldn't establish within-person effects, that's correct.
Q. Well, you're not establishing between-person effects either because you're -- you're only looking -- well, let me back up.
Your study doesn't, for example, look at -- I'll strike that. I'll strike it.
You agree that any -- one of the limitations of cross-sectional studies is that any association between the two variables may be related to a third variable that is not captured in the study, correct?
MS. EMMEL: Objection, vague, speculation.
A. That is a possibility, yes. That's --
BY MR. DAVIS:
Q. Well, it's not a possibility. It's a statement that you made in your report, isn't it?

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Look at page 12.
A. Yeah. Where do you want me to look at?
Q. First full paragraph.
A. Okay.
Q. Six lines down: Another limitation of these studies is that any association between the two variables may be related to a third variable that is not captured in the study.
Did I read that correctly?
A. That is correct.
Q. Right. And what you're talking about there is a confounder, right?
A. Correct.
Q. Right?
And just so people know what confounders are, confounders are potential explanations or reasons for why there may be an association, right?
A. That's correct.
Q. Right.
And confounders are not -- are not accounted for in cross-sectional studies, correct?

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A. Some cross-sectional studies account for the confounders. It's not a blanket statement that --

Q. Confounders -- let me ask it a different way.

In a cross-sectional study, confounders can't be ruled out as the reason for why there may be a statistically significant association, right?

A. Again, it's a -- it's a case by case, can be ruled out or cannot be ruled out. If you consider all the potential confounders of a relationship, and you adjust for them in the analysis, then you have adjusted for them. In effect, you have accounted for them.

Q. Yeah, I'm simply asking that: Are you aware -- well, let me back up.

A confounder is -- do you agree that in order to determine whether there is a nonspurious association --

A. Yeah.

Q. -- that bias and confounding have to be ruled out?

A. You have to define bias. What

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do you mean by bias?

Q. Well, you're familiar with reporting bias, right?

A. Right. But different biases --

Q. Yes. But I want to capture in every bias you can think of for a study, okay?

Do you agree that in order to make sure that you do not have a spurious association, that bias and confounding have to be ruled out?

A. Again, it's a -- yeah, it -- I'm not sure exactly what bias is meant here. Confounding can cause bias. Bias is when your findings deviate from the true value, so the multiple factors that can contribute in any type of study to bias, and that has to be adjusted to the extent possible in this study.

Q. Right. But --

A. Confounding is one of them. You can adjust for different confounding variables in the model and you can do a good job depending on what you have, or not.

Q. But irrespective of how you

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view bias, bias or confounding have to be ruled out to make sure you're not dealing with a spurious association, right?

MS. EMMEL: Objection, compound.

A. There could be bias in a study and the causal relationship could still be seen there, observed.

So it doesn't exactly work with -- you know, work against your causal inference.

Let's say your measurement is biased. You're somewhat getting a different reading on your measures than the realities, but in your analysis, you see that it's both groups, let's say, those who are exposed and not.

In that case, that bias necessarily does not work against the causal deduction.

BY MR. DAVIS:

Q. Okay.

A. So bias is different. That's why I'm hedging my --

Q. Okay. You agree that

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confounding has to be ruled out to --

A. Yeah.

Q. -- to determine that you're not dealing with a spurious association?

A. It has to be adjusted for -- to the extent possible for whatever factors you think are confounding your association.

Q. Right.

And if a study doesn't account for potential known confounders, it may produce a spurious association, right?

A. Or may, on the other hand, produce no association when one exists.

Q. Okay. And you agree that in order to establish that you're dealing with an association that's not spurious, you also have to rule out reverse causation, right?

A. Again, reverse causation may mean different things. If you're talking about reciprocal causation, it's possible that A causes B, B causes A.

In that case, ruling -- you don't need to rule out, you need to establish that one of these causes, that is, your interest, is happening.

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A lot of relationships are reciprocal.
Q. In order to assess whether reciprocal causation is taking place --
A. Yeah.
Q. -- you have to assess at the same time whether A causes B and B causes A, right?
A. You could do that, yes.
Q. Yes. Okay.
So for here, in this situation for social media, it would be assessing in your study that adverse mental health outcomes like depression or anxiety can be the reason why people are on social media, and in the reverse, that social media use is why people have symptoms of anxiety or depression, right?
MS. EMMEL: Objection, vague and compound.
A. Can be, yes.
BY MR. DAVIS:
Q. Is that right?
A. Your question is -- can you repeat, I'm sorry.

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Q. Yeah. I'm just trying to get reciprocal causation in the context of social media, right?
A. Yes. Yeah.
Q. What that means is that you want to make sure that in assessing your study, that social -- strike that.
In the context of social media, reciprocal causation means that you need to assess in your study that depression, anxiety or some other mental health situation is -- whether or not that's leading to social media use as well as whether or not social media use then results in depression, anxiety or some other mental health outcome, right?
MS. EMMEL: Objection, compound.
A. That's the definition of reciprocal causation.
BY MR. DAVIS:
Q. Okay. And you agree that in terms of your hierarchy, the pyramid of evidence, you put longitudinal studies above cross-sectional studies, right?
A. I did, yes.

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Q. And you say that longitudinal studies are designed to capture the temporal order of cause and effect, right?
A. Correct.
Q. And the reason you say that is because cross-sectional studies are not designed to do that, correct?
A. They are -- I'm going to have to qualify. There are cross-sectional studies, multiple waves, that could be looking at trends of one variable versus the other variable.
And so saying that they are not designed to do that is -- I don't think it's accurate in every case. In most cases, I would agree.
Q. Yeah. You say: A major advantage of longitudinal studies is that they allow researchers to examine -- examine the temporal order --
A. Right.
Q. -- of events, which is one of the Hill guidelines for causal associations. Correct?
A. Correct.

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Q. You don't say that about cross-sectional studies in your report, do you?
A. Typically not.
Q. Okay. You agree that longitudinal studies take precedent over cross-sectional studies with respect to a causal assessment, right?
MS. EMMEL: Objection, vague.
A. Yeah, that's implied in the pyramid that I put there.
BY MR. DAVIS:
Q. Okay. And you agree that if a longitudinal study assesses the exposure and the outcome at the same time, it is really doing a cross-sectional analysis, right?
A. By definition, longitudinal studies have more than one wave, so the assessments are done at different --
Q. Let me ask it a different way.
A. Yes.
Q. Tell us what lagging is. Lagging in a longitudinal study, what is it?
A. That's a way of analyzing the data, if you have longitudinal data that are

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spaced -- the assessments are spaced at regular intervals or even irregular. Nowadays they can do it with irregular intervals.

And you can look at the effect of two variables or more, A at one time impacting B at time two, and B at time one impacting A at time two.

So you could do that, and you have to take into account auto-regression, which means that association of the same variable measured over time.

Q. Right.

And if a longitudinal study doesn't do that type of lagging, and instead, takes out and measures outcome and exposure at the same time --

A. Right.

Q. -- what it's really doing is doing cross-sectional analysis at multiple points along the longitudinal study, right?

A. I'm not familiar with a longitudinal study that does that.

Q. All right. You've got -- at the top of the pyramid, you've got

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experimental studies, right?

A. Right.

Q. And you agree that they are generally referred to as the gold standard when it comes to making causal assessments, right? Yes?

A. Yes, that is correct.

Q. And you don't believe it's practical to actually assign participants in an experimental study when it comes to social media use, correct?

A. I don't think it is practical or even ethical to assign adolescents, for example, to use social media or not use social media for long time -- long period of time and look at its impact.

Q. Well, irrespective of -- you understand that there are experimental studies that have been done with respect to social media use, right?

A. There have been studies that have limited or restricted social media use for a few weeks at most, or some of them maybe a couple of months, and then looked at the impact on the outcomes.

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Q. Okay. And you agree that if you're going to do a randomized controlled trial for social media use, you ought to make sure that the study participants are blinded, right?

A. Blinding is coming -- comes from the pharmaceutical randomized controlled trials, where you can have a placebo pill that looks exactly like the medication, active medication.

I don't think it is even feasible to blind people. You're telling them to not use their social media for -- or use it less, how could you blind them?

Q. What's the effect of not blinding them for the -- with respect to the RCTs for social media use?

MS. EMMEL: Objection, vague.

A. What's the advantage of blinding?

BY MR. DAVIS:

Q. No, what's -- yeah. Let me --

A. Yeah.

Q. Given that you agree that almost all of the studies, experimental

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studies on social media use, are not blinded, right?

A. They cannot. It's almost impossible to tell them to do something and then forget about what I told you to do.

Q. So what's the limitation from doing that?

A. It could create some expectation in the subjects that -- if they know what the purpose of the study is.

Q. You're talking about a demand effect?

A. In effect.

Q. So, for example, the study participants know what the study is about, and then, consciously or subconsciously, mold answers to questions they get in the study about how they feel to what they think the answer ought to be?

A. It's a potential.

Q. It's a potential limitation?

A. Yes.

Q. Right.

And in your mind, did you look at any of the experimental studies to

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determine whether they adequately control for demand effects?
A. The one study that I looked at described the -- so assigned the subjects to different arms. One of them, I think, was water restriction and the other, social media restriction, and they didn't specifically tell them what the purpose of this study was.
Q. Yeah. I think you may have missed my question.
My question was: When you looked at each of the experimental studies on social media, did you analyze them specifically for the issue of the impact of demand effects on the study findings?
A. As I said, it's almost impossible to blind this study, so there's no -- you know, there's nothing to look at or --
Q. I'm just asking you: Did you take -- when you looked at the randomized controlled trials or experimental studies on social media, did you analyze them specifically for how demand effect could have impacted the study findings?

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MS. EMMEL: Objection, asked and answered.
A. There is -- I could say yes. I had an eye on that, and there's one study specifically, the meta-analysis by -- through -- I think that was published in 2025, and they divided the sample into those who had restrictions in social media use for less than one week and some, more than one week.
And they found that social media restrictions was actually causing negative effect in those who were exposed to less than one week whereas it was protective or improved their mental health in the longer studies.
This tells me that the demand -- if there is an effect of demand, it is small. It's not impacting causal inference based on these studies.
BY MR. DAVIS:
Q. In your report, you never set out any analysis of the demand effects in the experimental studies, do you?
A. I don't recall that I have done

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that in my report.
Q. Right.
A. I don't know I've -- maybe in the May report I talked about it or--
Q. I didn't find it, so if you know of it, I want you to tell me now.
A. Well, as I told you, the Thrul study gave me -- I think it was published -- may have been published after my April report at least. So gave me the idea.
You said in my -- looking at evidence, did I see some, and that's everything -- good evidence in my mind that demand is not a major factor.
Q. Let me make sure I understand what you're saying.
A. Yes.
Q. What study are you referring to from 2025?
A. Johannes Thrul and colleagues. I don't know if it is in the list of the studies here, but it's -- I'm sure it's in the material considered.
MR. DAVIS: Let's go off the record so you can find it.

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THE WITNESS: Sure.
THE VIDEOGRAPHER: All right. We're off the record at 1:55 p.m. That's the end of Media 4.
(Recess taken, 1:55 p.m. to 1:55 p.m. CDT)
THE VIDEOGRAPHER: We're back on the record at 1:55 p.m. This is the beginning of Media 5.
BY MR. DAVIS:
Q. All right. You were able to identify the 2025 study as the Thrul, T-H-R-U-L, study, right?
A. Yes.
Q. Okay. And that was a study that you added to your MDL federal report in May of 2025, right?
A. Actually, it was in this one. So this is the April report.
Q. Okay. So help me out again.
Other than looking at the Thrul 2025 meta-analysis, did you do any other type of analysis to assess demand effects in any of the experimental studies on social media?
A. I didn't see any -- any

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variables that could actually help me examine whether there was differences in demand or not.

Q. Okay. So another way of saying it is that the studies themselves didn't specifically assess demand effect so that you couldn't either?

A. If they had assessed it, maybe they did, I can't speculate. Maybe they --

Q. I'm just only asking about what they reported.

You didn't see any assessment in the RCTs on social media use where they specifically analyzed demand effects in those studies, right?

A. I personally did not.

Q. Okay. And you agree that if you're going to -- none of the experimental studies on social media use actually look at diagnosed disorders, correct, diagnosed psychiatric disorders?

MS. EMMEL: Objection, vague.

A. I should say that there are some studies that look at the restriction in social media use in children/adolescents with

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preexisting mental health problems, so that's a diagnosed disorder.

BY MR. DAVIS:

Q. I'm asking about experimental studies.

A. Yeah. Well, experimental studies, they -- restrictions for children/adolescents with mental health problems, I believe there is.

Q. Which study?

A. I have to look at it and find it. Let's see where they talk about preexisting...

(Document review.)

MR. DAVIS: Why don't we go off the record while you look.

THE WITNESS: Sure.

THE VIDEOGRAPHER: We're off the record at 1:59 p.m. That's the end of Media 5.

(Recess taken, 1:59 p.m. to 2:02 p.m. CDT)

THE VIDEOGRAPHER: We're back on the record at 2:02 p.m. This is the beginning of Media 6.

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BY MR. DAVIS:

Q. Dr. Mojtabai, did you find the RCT that you say actually assessed diagnosed disorders as an outcome?

MS. EMMEL: Objection, misstates testimony.

A. As an outcome of -- no, I didn't say that.

BY MR. DAVIS:

Q. Let me clarify my question, then.

A. Right.

Q. Is there any experimental study that you analyzed that had an outcome of a diagnosed psychiatric disorder?

A. So outcome of psychiatric -- diagnosed psychiatric disorder.

There are so many elements in this. Diagnosed, you mean by clinician diagnosed?

Q. Yes. Where there was some -- a clinical evaluation and an assessment that someone had a psychiatric disorder, that that was the outcome that was measured.

A. So let me see if I understand.

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So you're saying they take children and some of them are reducing use of social media, some of them are not reducing use of their social media, and then after the experiment, at the end of the experiment, they look at the incidence or prevalence of diagnosed-by-clinician mental disorders?

Is that your question?

Q. Yeah.

A. Is that the design you're thinking about?

Q. Yeah. I'm looking at it where there's an experimental study where there's some intervention, either social media use is not -- is discontinued, stopped overall, or reduced in some way, and then the outcome that they're analyzing is psychiatric -- a psychiatric disorder.

Is there such an animal?

A. That animal, if it exists, has to be very large and infeasible to conduct.

Q. I'm not asking whether it's feasible or large. I'm just simply asking: Is there such a study that fits that description?

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A. If it's not feasible, it doesn't exist.
Q. You don't know of one, do you?
A. I don't know of.
Q. Do you know of any longitudinal study where the outcome that was being measured was a diagnosed psychiatric disorder?
A. I think we established that there are not many studies in psychology or in psychiatric epidemiology where the outcome is a diagnosed psychiatric disorder by a clinician. I mean, it just doesn't happen because --
Q. That's not my question. I'm not asking what someone else does.
I'm asking for the studies that you looked at --
A. Yeah.
Q. -- was there any longitudinal study that actually assessed a diagnosed psychiatric disorder as an outcome measure?
A. I'm not aware of one.
Q. Are you aware of any cross-sectional study that used a diagnosed

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psychiatric disorder as an outcome measure?
A. Again, diagnosed, you mean the same thing that we talked about, which is a -- can you define diagnosed again for me?
Q. You diagnose people all the time, right?
A. By a clinician you mean?
Q. Correct, a clinician or other specialist, right?
Is there any -- some specialist or professional -- okay, let me ask the question again.
A. All right.
Q. Is there any cross-sectional study that you know of that assessed diagnosed psychiatric disorder -- I'm sorry, I butchered that. Let me start again.
Is there any cross-sectional study that you know of that assessed as an outcome measure a diagnosed psychiatric disorder?
A. By a clinician?
Q. Or other professional.
A. Or other professional.
That's not the standard of

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research in mental health field, so --
Q. Do you know of one?
A. I don't know of any.
Q. Okay. Now, let's go back to talking about confounders real quick, okay? Wait a minute. Okay. Never mind. We...
You agree that the studies that you're relying upon almost exclusively rely upon self-reports of their symptoms?
MS. EMMEL: Objection, vague.
A. Some of these studies have looked at other outcomes like suicide, suicidal behavior. Some have report -- have relied on behavioral outcomes, like eating disorder symptoms, like dieting or using laxatives, et cetera.
But in general, in mental health research and psychiatric epidemiology, we rely on validated self-report measures. Even clinical assessments that you're mentioning as a standard, it relies on self-report.
You ask patients questions about their sleep, their mood, their activities, impairment in functioning. These

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are all self-report.
MR. DAVIS: I move to strike as nonresponsive.
BY MR. DAVIS:
Q. Dr. Mojtabai, the suicidality studies that you mentioned, those were based upon self-reports of self-harm or suicidal thoughts or behavior, right?
A. Or parental reports.
Q. Right. But again, self-reports, right?
A. Well, we don't know. You're assuming that the parents are relying on...
Q. And the eating disorder symptoms studies that you mentioned, those are also based upon self-report by the patient or by parents as opposed to an actual diagnosis, correct?
A. Or scales, questionnaires that developed -- are developed for assessment of these outcomes.
Q. The scales are based upon self-reports by the patients, right?
A. The way we get data from our subjects in our field is self-report, mainly.

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Q. Let me go back to my question.
The eating disorder symptom studies that you mentioned are based upon self-reports, including screening scales or tools that the patients or the parents complete, correct?
A. I wouldn't call them screening. They're -- the measures are to replicate the way a diagnostician would go about asking questions. They would standardize and replicate. In that way, they ask the same question from every person.
And that's why we don't use clinicians, because clinicians are individual. They could ask different questions. Their judgment would get in the way -- subjective judgment would get into the way, and the results would be unreliable.
MR. DAVIS: Move to strike as nonresponsive.
BY MR. DAVIS:
Q. My question simply was: For the eating disorder symptom -- strike that.
For the studies that you discussed about eating disorder symptoms,

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those were based upon either self-report or questionnaire that patients or parents had filled out, and not an actual diagnosis of an eating disorder, fair?
A. I think it's a fair statement.
Q. Okay. Now, you agree that people -- look at page 12 of your report.
You say that people are -- will you agree that people are generally not good at accurately recalling past events and the temporal order of past experiences, right?
A. Which one are we talking about, the second full paragraph?
Q. Yes.
A. Yeah?
(Document review.)
A. Yeah, I see that.
BY MR. DAVIS:
Q. And you agree with my statement, then? You agree, right?
You agree that people are generally not good at accurately recalling past events and the temporal order of past experiences, correct?
A. No, I don't agree with that.

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Because it's out of context. I'm talking about case-control studies. Case-control studies go years behind, so you go -- you ask -- so in school, was the -- were you -- did you fail that subject, and 20 years later, people cannot remember that.
There is good evidence that if you ask about recent events, people have better memories.
We all remember what we ate for lunch today and we all remember what we ate for breakfast, but maybe two weeks before, we won't remember.
Q. You have said that a major limitation of psychiatric research is the fact that it's built on self-reports, correct?
MS. EMMEL: Objection, misstates testimony.
A. Where did I say? I'm sorry.
BY MR. DAVIS:
Q. Is it your testimony you've never said that?
A. What did I --
Q. Is it your -- you have said

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publicly --
A. Uh-huh.
Q. -- that a major limitation of psychiatric research is that it's built on self-report, correct?
A. I said it here?
Q. Have --
A. No, I didn't -- I don't recall that.
Q. Let me play you a clip of what you said at a presentation.
A. Okay.
---
(Whereupon, Exhibit 12 was played in the deposition room, transcribed as follows.)
DR. MOJTABAI: We rely on self-report. We do not have objective measures of disorders, and that is a major limitation.
(Transcription ends.)
---
BY MR. DAVIS:
Q. You agree with that, right?
A. I have to contextualize it.

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Q. Do you -- let me ask my question first.
Do you agree with that statement?
A. Well, I mean, when you take it out of the context, how could I agree with it or disagree with it? I have to contextualize it.
I'm talking about the problem with mental health in general, in general, is that we don't have measures like blood pressure, blood sugar, and that's a major limitation of the field.
MS. EMMEL: Also, Counsel, we would like that introduced as an exhibit, and we would like to know where that clip came from.
MR. DAVIS: Noted.
BY MR. DAVIS:
Q. Now, you agree that the relationship of social media use with depressive symptoms may be related to poor peer relationships, correct?
A. It could be related to a host of other risk factors, right.

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Q. Such as what?
A. Depression, you mean? Can you ask me again what specific...
Q. Yeah. I said the relationship of social media use with depressive symptoms may be related to poor peer relationships.
A. Right.
Q. And then you agreed, and I said -- you said it could be related to a number of things. And I said: What are the other things?
A. So I didn't hear the first part of it. You're talking about social media. So it can't be related to -- it can't be related to a very large host of things, but it could be -- I'm thinking what it could be related to.
It could be related to the way that children interact with social media or it could be related to the fact that they're not engaging in other things because they're not able. They're spending all their time on social media so they don't have time to hang out with their friends, to socialize.
So it could be...

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MR. DAVIS: Move to strike as nonresponsive.
BY MR. DAVIS:
Q. You agree that -- I want to go back to experimental studies for a moment, okay?
A. Sure.
Q. Do you agree that virtually all of the experimental studies on social media did not have a patient population focused on either adolescents or children younger than 12?
MS. EMMEL: Objection, speculation, vague.
A. I have to go through the list to see if the ages of some of those studies were inclusive of 12 or not.
BY MR. DAVIS:
Q. Can you think of any today that had -- that exclusively looked at an age range of 10 to 19?
A. In social media experiments, you mean?
Q. Yes.
A. I recall there was one study, I

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think, where I talk about the experimental studies that was inclusive of only adolescents, but it's -- I remember that one study. The name of the author, I have to look.
Q. Do you know of more than one study?
A. Other studies included adolescents --
Q. Yeah. I'm asking a different question.
Do you know of more than one study that looked at -- of experimental studies that looked at the age range from 12 to 19?
A. Exclusively those ages?
Q. Somewhere in that range, yes.
A. Nothing outside of that range?
Q. That's right.
A. That one study comes to my mind. I don't remember the author, but I have referenced it and have made this point that this study is --
Q. Do you agree that for most of the experimental studies, what they did was

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what are called convenience samples?
A. Well, convenience sample -- sampling is -- again, is a very broad term. It could mean that right now everybody is in this room, I pass out a questionnaire, that's a convenience sample. But then it's possible that people are recruited through online. Some of these studies recruited online. I wouldn't call that necessarily a convenience sample. Online sampling or even sample in a school could be -- or in a college -- I wouldn't necessarily call it a convenience sampling unless it is a specific class. If it's a Psychology 101, I go and administer the question to them because it's a captive audience. It's very convenient.
Q. I'm just simply asking: Do you agree that most of the studies, the experimental studies, were convenience samples of college students?
MS. EMMEL: Objection, foundation.
A. I do not agree with that because I can't -- I don't -- I don't know if

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they were from the same class or they were sample -- representative sample of college students.
BY MR. DAVIS:
Q. If you only had the experimental studies --
A. Right.
Q. -- on social media use --
A. Uh-huh.
Q. -- and adverse mental health outcomes, could you reach an opinion to a reasonable degree of medical or scientific certainty that social media use causes the adverse mental health outcomes you've identified in your reports?
MS. EMMEL: Objection, speculation.
A. Yeah, it's again -- I go back to your first question. In my mind, I look at the totality of these studies. I cannot in my mind separate them, say, well, can I base my judgment on just experimental studies or just longitudinal studies or just cross-sectional studies. I have to consider all of them

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because each one of them have limitations.
BY MR. DAVIS:
Q. Well, I'm asking you --
A. Right.
Q. -- as an expert -- I'm allowed to ask you hypothetical questions. And my hypothetical to you is: If you only had the experimental studies, could you form an opinion to a reasonable degree of medical or scientific certainty that social media use causes the adverse mental health outcomes in your report?
A. You can ask hypothetical questions, but I don't have to answer hypothetical --
Q. You don't have to answer for me today?
A. I cannot, based on just separating those, make a decision or make an opinion sort of like a partial opinion based on that. I look at all of these studies.
Q. So you need the -- do you need the experimental studies to form --
A. They help. They all help.
Q. Just let me -- do you need them

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to form an opinion to a reasonable degree of medical or scientific certainty?
A. Those are parts of this puzzle. I was talking about this puzzle that we're putting together. They're part of the puzzle too.
Q. And my question is: If they weren't part of the puzzle, could you form an opinion to a reasonable degree of medical or scientific certainty that social media use causes the adverse mental health outcomes that you identified in your reports?
MS. EMMEL: Objection, speculation.
A. Yeah, I -- it's hard for me to separate them in my mind. They are part of the -- you have a body of evidence and you can't say, okay, take this part out and would you be able to make that decision? It's hard for me to do that.
BY MR. DAVIS:
Q. On your Pyramid of Evidence --
A. Right.
Q. -- you don't have meta-analyses anywhere on the list, do you?

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A. I don't.
Q. Okay. So, for example, you didn't put meta-analyses at the top of the pyramid, did you?
A. I did not.
Q. And you didn't put meta-analyses of -- strike that.
Is it fair to say that when you put together your Pyramid of Evidence, you decided that meta-analyses did not belong in the pyramid?
A. This pyramid was based on another study that was published, an opinion piece, and they had a good point that in the past, meta-analyses were limited to experimental studies, and they would confer a higher degree of evidence or support for causal attributions than individual experimental studies.
But nowadays we have meta-analysis of cross-sectional studies, of longitudinal studies and experimental studies. So he, the author, suggested that -- I think it's -- I agree with that, that it's a lens that you could use to look

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at the totality of these different studies. And so it's not a type of study like --
Q. Where would you put a meta-analysis consisting entirely of cross-sectional data on the Pyramid of Evidence?
A. It's definitely higher than individual single cross-sectional studies that I -- that we talked about.
Q. Would you put it ahead of longitudinal studies?
A. It's like asking do you choose your daughter or your son. It's hard decision. It is -- depends on the -- it depends on the cross -- on the meta-analysis, how large it is, how many studies are included, are the studies for diverse setting, different authors, large samples? Are they using validated measures? Yeah, all of that.
Q. So is it fair to say that sitting here today, you don't know where you'd put cross-sectional studies that were -- strike that.
Fair to say you don't know

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sitting here today where you would put a meta-analysis consisting solely of cross-sectional data on your Pyramid of Evidence?
A. I don't think that it even fits in the pyramid. It's a lens. That's why he's talking about a lens and doesn't put it anywhere in this. He could have put it between cross-sectional and longitudinal, longitudinal and experimental. Again, it's a lens. It magnifies. A lens does that. It magnifies.
Q. But the meta-analyses, just so we're clear, meta-analyses don't -- strike that.
If there's a limitation in a group of cross-sectional studies --
A. Yeah.
Q. -- that are in a meta-analysis, the meta-analysis doesn't cure that limitation, does it? It just carries it forward, right?
A. That's why I said if it comes from different authors, different settings, different samples, different times, different

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locations, those confounding variables are not -- it's very hard to imagine a setting where the same confounder is in every setting, every study, every author, every sample, every country.
So it changes. It's more -- it provides more support than individual studies.
Q. Right. But the meta-analysis of cross-sectional data doesn't fix the limitations that the -- each individual cross-sectional study has that's included in the meta-analysis, right?
MS. EMMEL: Objection, asked and answered.
A. It doesn't fix that study's limitation, but the results you get from a meta-analysis would be more reliable than what you would get from an individual study, or from tallying the individual studies, saying, okay, this one said yes, this one said no.
BY MR. DAVIS:
Q. All right. Let me show you an article that you've coauthored.

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(Whereupon, Mojtabai-11, Adverse childhood experiences and comorbidity in a cohort of people who have injected drugs, by Sosnowski et al, was marked for identification.)

A. Sure.

BY MR. DAVIS:

Q. It's Exhibit 11. Do you see that this is an article entitled Adverse Child Experiences and Comorbidity in a Cohort of People Who Have Injected Drugs.

Right?

A. Correct.

Q. And if you turn to page -- page 2.

A. Page 2, yes.

Q. Sorry. End of page 1.

A. Yes.

Q. It says at the end of page 1: Seminal research in 1998 established that adverse childhood experiences are a risk factor for a wide range of mental, behavioral and physical health problems, including many of the leading causes of death.

Did I read that correctly?

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A. Correct.

Q. And you agree with that, right?

A. Yeah.

Q. And the next sentence says: Subsequent research found that the type of health problems most strongly and consistently linked to a history of childhood adversity are substance use problems and substance use disorders, specifically opioid use disorder.

Correct?

A. Yes.

Q. Okay. And you agree that adverse childhood experiences are a potential confounder for every psychiatric disorder and every mental health outcome that you attribute to social media use, right?

MS. EMMEL: Objection, vague.

A. Yeah, I -- it's -- can you repeat your question? What is the question?

BY MR. DAVIS:

Q. Social -- adverse childhood experiences are a potential confounder for depression, right?

A. Yeah.

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Q. For anxiety, right?

A. Correct.

Q. For suicidality, right?

A. Correct.

Q. For eating disorders, right?

A. Sure, yeah.

Q. For disordered eating or body imaging issues, correct?

A. Yes.

Q. Okay. And are you aware of any experimental or longitudinal study that assessed childhood -- adverse childhood experiences as a potential confounder in the study on social media use?

A. So, first of all, can you define for me -- because I don't know where you're going -- what is confounder in your mind? What is a confounding variable?

Q. Confounder how you've defined it.

A. Okay.

Q. Okay?

A. Confounder is a variable that is cause of both A and B.

Q. That's right.

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A. Okay.

Q. So you agree that adverse childhood experiences can, one, lead to social -- more social media use, right?

A. I haven't seen any evidence of that.

Q. Well, if a child is having trauma at home, they feel isolated at home, they're having difficulty in school or having family problems or friend problems, or have physical or emotional trauma, all of that can lead to more social media use, right?

MS. EMMEL: Objection, compound.

A. Yeah, this is a lot of -- adverse childhood experiences are very specific here. You --

BY MR. DAVIS:

Q. But --

A. -- might have trouble in school --

Q. I'm sorry, go ahead, Dr. Mojtabai.

A. Yeah, yeah. You put trouble in school, trouble at home, this, that. These

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are not all adverse social -- adverse childhood experiences.
Q. Physical and emotional trauma at home is an adverse childhood experience, right?
A. That could be an adverse childhood experience.
Q. It is, right?
A. If it is caused by something happening -- so give you an example. If like a child lives in a war region and there is bombing all the time, that's a stressor.
Q. We don't need bombing at home --
A. Right.
Q. -- to have an adverse childhood experience, right?
A. It's being physically abused, neglected, being sexually abused, those are the factors that --
Q. Okay. Can you identify any -- as you define in that definition of adverse child experiences, can you identify any longitudinal or experimental study on social media that included that as a confounder?

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A. First we have to establish that it is a cause for social media use, increased social media use. A confounder is a variable to both -- is related to both exposure and the outcome.
We know these variables are related to the outcome, but we don't know that they're related to social media.
Q. It's a potential confounder, right?
A. It has to be based on research.
Q. But wait a minute. Wait a minute. When you do potential confounder -- let me strike that.
You agree that when you have an abuse at home, neglect at home, physical or emotional trauma to a child at home, that's a risk factor for psychiatric disorders, correct?
A. That part -- that arrow, we know.
Q. Yes. Right.
And so for any of the studies that you rely upon for social media use, did any of them specifically account for that

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risk factor as a potential confounder?
A. That's -- I don't know where you're getting the potential confounders, because that -- the second leg of this argument, that these social -- or adverse childhood problems are related to social media use, I haven't seen much evidence for it.
Q. Well, you agree that if some -- if a child has physical, emotional or other abuse at home, they become more isolated, correct?
A. They may. Some of them become --
Q. Yeah.
A. They present more externalizing behaviors. They join gangs. They maybe engage in rule-breaking behavior.
Q. They become isolated too, right?
A. That could happen too.
Q. And when they become isolated, one thing they can do is to use social media use -- to do social media more, right?
A. I can't agree or not agree

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based on having seen no research on that.
Q. Setting aside whether or not you think it is a potential confounder, have you -- can you identify any longitudinal or experimental study on social media that took into account as a potential confounder adverse childhood experiences?
A. So you mentioned certain behaviors that result from adverse childhood experiences. Adverse childhood experiences by themselves do not lead to increased use of social media.
So you mentioned maybe child is more isolative, may have more depressive symptoms maybe, and that could -- there is some evidence suggesting that there is an association between increased depressive symptoms and use of social -- increased use of social media. That's the reciprocal causation we were talking about.
MR. DAVIS: I move to strike as nonresponsive. That's not the question I asked you, Dr. Mojtabai.
THE WITNESS: Okay.
///

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BY MR. DAVIS:
Q. I'm asking you, setting aside whether or not you think it's a potential confounder, can you identify any longitudinal or experimental study of social media that took into account adverse childhood experiences as a potential confounder?
A. Again, when we talk about causation, there is a sort of first source of causation, or second, and then like the -- what you're saying is that adverse childhood experiences lead to certain behaviors, like depressive symptoms or isolating themselves, social anxiety, maybe, right? And those kids are more likely to then use social media.
If you adjust for those variables, intermediary variables, you have broken this backdoor way of causation. So if -- if -- if we agree, and there's no evidence that I have seen, that adverse childhood experiences are associated with increased social media use or -- or addictive social media use, even if we assume that there is this relationship -- direct relationship, it is indirect; and it is true

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other behaviors we talked, internalizing behaviors.
And I've seen studies that adjusted for those. As such, they have broken that factor.
MR. DAVIS: I move to strike as nonresponsive.
BY MR. DAVIS:
Q. Dr. Mojtabai, name one study, longitudinal or experimental --
A. Right.
Q. -- that specified that it was using adverse childhood experiences as a potential confounder when assessing social media use.
A. Again, I have to go back to this -- your -- I don't think there is evidence for it to be confounding variables.
Q. You've made that clear. I'm asking you -- this is my chance to ask you a question about your opinions you're going to offer in the case.
A. Yes.
Q. Name one study that did that.
A. You're asking my opinion or--

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Q. Name one study --
MS. EMMEL: Objection --
BY MR. DAVIS:
Q. -- that assessed childhood -- adverse childhood experiences as a potential confounder.
MS. EMMEL: Objection, asked and answered.
A. I have not looked at the studies specifically for this variable because I don't consider there is strong evidence that it is a confounding variable.
BY MR. DAVIS:
Q. Can you identify any experimental or longitudinal study that used as a potential confounder the history of family psychiatric disorder?
A. I have to look at the individual studies and see if they have considered that or not. I'm not --
Q. Can you name one today?
A. I'm sorry?
Q. Can you name one today?
A. If I can't remember, I can't name them.

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Q. Okay. Can you identify any longitudinal or experimental study that assessed as a potential confounder the study participants' past psychiatric diagnoses and history?
A. Well, even the longitudinal study that Riehm and I were involved in looked at internalizing symptoms year one, looked at marijuana and alcohol use disorder in the lifetime. We may have also looked at family history, and certainly home environment factors, we looked at those.
MR. DAVIS: Okay. I don't think you -- object as nonresponsiveness.
A. We have that study --
BY MR. DAVIS:
Q. Can you identify any longitudinal or experimental study that assessed as a potential confounder the study participants' past psychiatric diagnoses or history?
MS. EMMEL: Objection, asked and answered.
A. I haven't looked at the studies

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to -- I don't have the list of the confounding variables in different studies.
BY MR. DAVIS:
Q. You can't name one for me today, can you?
MS. EMMEL: Objection, asked and answered.
A. I have to look within the studies to see what variables they adjusted for.
BY MR. DAVIS:
Q. Now, you agree that a past psychiatric history and family history of psychiatric disorders are -- both of those place a person at an increased risk for having symptoms of a psychiatric disorder or an actual diagnosis of a psychiatric disorder, right?
A. That is, yes, reasonable assumption.
Q. And you agree that past -- someone who has a psychiatric disorder may turn to social media use more frequently because of that psychiatric disorder?
MS. EMMEL: Objection, vague.

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A. There are studies that show that actually children/adolescents with higher levels of depressive symptoms are more likely to use social media.
BY MR. DAVIS:
Q. And that's also true for other psychiatric symptoms too, right, besides depressive disorders?
A. There is also some data showing that children/adolescents with symptoms of eating disorders or who are prone to make social comparisons are more likely to use social media.
Q. Right.
Do you agree that personality traits such as negative temperament or negative affectivity can place someone at an increased risk for developing psychiatric disorders or symptoms?
A. They could, yes.
Q. And can you identify any experimental or longitudinal study that assessed negative temperament or negative affectivity as a potential confounder --
A. Well, I --

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Q. -- for social media use?
MS. EMMEL: Objection, compound.
A. First of all, can you define to me negative affectivity means? What is meant by it?
BY MR. DAVIS:
Q. Negative temperament.
A. What is negative temperament?
Q. You -- well, someone who has a negative outlook on the world.
A. Okay. In general, people with a more negative outlook on the world are more likely to experience depression, yes.
Q. And other psychiatric disorders too, right?
A. Yeah.
Q. And so my question is: Can you identify any longitudinal or experimental study that assessed as a potential confounder the study participants' negative temperament or negative affectivity?
A. I think the Millennium study did look at the personality factor, Millennium study of UK.

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Q. Any others?
A. I would suspect the British studies because they're more likely to include those measures.
Q. Which British studies?
A. Well, Millennium is one of them.
Q. What's the other, if any?
A. Yeah, I can't specifically name them, but I have seen studies adjusting for this.
Q. Can you identify any here for me here today besides the Millennium study?
A. I have to look, if you want. I have to look at the individual studies if you want -- individual longitudinal studies, because I haven't done that as something that I needed to do for report.
Q. Okay.
(Document review.)
BY MR. DAVIS:
Q. Let me turn your attention to Section 4.1 of your report, right?
This is -- there are two places in your report that you discuss your opinions

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about vulnerability of adolescents or subpopulations.
One is Section 4.1 and the other is 5.8, correct?
A. For adolescents -- yes.
Q. Okay. You haven't been able to identify in any of the literature any criteria for a way to identify a subgroup of adolescents that may be more vulnerable to social media use, have you?
MS. EMMEL: Objection, vague and compound.
A. There are studies that show that certain groups are more vulnerable to social media -- to experiencing, for example, comparison, social comparisons on social media, and then experience a negative mood.
BY MR. DAVIS:
Q. But in terms of identifying who those people may be in advance, you're -- you don't know of a set of criteria that allows somebody to identify who those are, right?
A. Well, as I mentioned, different studies have -- have used measures of sort of, like, people's -- you're talking about

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personality, or other vulnerabilities that might predispose them to develop adverse mental health outcomes when exposed to social media.
Q. Changing topics just slightly.
A. Okay.
Q. You haven't been asked to assess and give opinions on any of the individual plaintiffs that are involved in this litigation, have you?
A. No.
Q. You don't have any opinions about whether or not a specific or particular plaintiff involved in this litigation either has social media addiction or has some adverse mental health outcome from that claimed addiction, correct?
A. Correct.
MR. DAVIS: Okay. Why don't we take a break.
THE WITNESS: Okay.
THE VIDEOGRAPHER: We're off the record at 2:44 p.m. That's the end of Media 6.
(Recess taken, 2:44 p.m. to

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3:02 p.m. CDT)
THE VIDEOGRAPHER: We're back on the record at 3:02 p.m. This is the beginning of Media 7.
MR. DAVIS: Yes. In connection with discussions with plaintiffs' counsel during the break, we've marked as Exhibit 12 the video clip on self-reports that Dr. -- that I played for Dr. Mojtabai, and so we're going to have that as Exhibit 12, and I will send a copy to plaintiffs' counsels.
(Whereupon, Mojtabai-12, Video Clip on Self-Reports, was marked for identification.)
BY MR. DAVIS:
Q. Dr. Mojtabai, are you ready to continue?
A. Yes.
Q. All right. If you turn to page 20 of your report, last paragraph, first sentence.
A. Page 20, last paragraph -- last paragraph, I'm sorry?

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Q. You see that?
A. Last paragraph --
Q. Page 20, last paragraph, first sentence.
A. First sentence.
Q. Okay. Do you see where you say: There is scant research on heritability and genetic influences of problematic social media use specifically.
Right? Do you see that?
A. Yes.
Q. Do you agree that there's no known genetic influence or susceptibility to what you call social media addiction that's been established?
A. To my knowledge, yes.
Q. Okay. You also state on page 18 -- if you go to page 18 of your report.
A. Yes.
Q. Second-to-last paragraph.
A. Uh-huh.
Q. Middle of the paragraph you say: In other studies, impulsivity, low self-esteem, and social anxiety were

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identified as predictors of social media addiction.
Do you see that?
A. Uh-huh, yes.
Q. Yes?
A. Yes.
Q. And by that, by predictor, you mean that if someone had impulsivity, self-esteem or social anxiety, they were more likely to be using social media than other people?
A. I say social media addiction, not using social media. Those are different constructs.
Q. Okay. So use of social media alone doesn't establish addiction, right?
A. The amount of use of social media could be an indicator, as we talked about, if the child is using social media all day and not doing other activities, that by itself already, you know, has some symptoms of addictive use.
Q. I guess in your mind, time spent on social media is something to be looked at but is not alone dispositive of

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whether or not someone has social media addiction?
A. Correct.
Q. Okay.
A. Unless it is excessive.
Q. Okay. In other -- so in terms of impulsivity, low self-esteem and social anxiety --
A. Yeah.
Q. -- as predictors of social media addiction, do you agree that impulsivity, low self-esteem, and social anxiety can also lead to increased use of social media that doesn't rise to the level of what you call social media addiction?
MS. EMMEL: Objection, compound, vague.
A. So nowadays, every child is using social media, so use of social media as an outcome is, by itself, not very meaningful. It's like children who go to school. So everybody -- every child goes to school. It's something that everybody does.
BY MR. DAVIS:
Q. Why do you believe that use of

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social media as an outcome is not very useful or reliable?
A. I didn't say it's not useful or reliable. I'm saying a measure of what? As an outcome of what?
And if it is a -- use of social media is ubiquitous. Everybody is using it, and what is it an outcome of?
Q. Okay. So is social media use generally just too -- too loose of an outcome to assess?
A. I don't think use of social media by itself is a symptom of anything or a problematic issue by itself. So -- and it's a -- it's part of the normative behavior of adolescence nowadays. According to Pew reports, almost all of the kids use some form of social media.
Q. Do you agree that impulsivity, low self-esteem and social anxiety --
A. Right.
Q. -- can increase the likelihood that a child or adolescent is using more social media?
A. More -- the sentence here --

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Q. I'm not focused on the sentence. I'm on a different issue. So let me come back to my question so you'll have it in your mind, okay?
A. Okay.
Q. Do you agree that impulsivity, low self-esteem and social anxiety in children or adolescents can lead to more social media use?
A. I haven't seen studies of that. I have seen studies as here referenced that show these are related to problematic use of social media.
Q. But just as a matter of common sense, right, just knowing how the world works, you factored that in as somebody who is an expert, right?
A. Expert in what?
Q. Sure. Just -- the fact that somebody has low self-esteem or impulsivity or social anxiety, knowing a child or adolescent has that, it stands to reason that those individuals are more likely to spend -- doing something with more screen time, right?
A. No, I can't -- I haven't seen

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evidence of that.
Q. All right. Now, on page 18 of your report, you claim that adolescent girls are more vulnerable to the negative effects of social media than boys, especially appearance-based comparisons, correct?
A. Uh-huh.
Q. Yes?
A. Yes.
Q. And you cite, in support of that opinion, Nesi and Prinstein 2015, and Liu, L-I-U, 2022, correct?
A. Correct.
Q. You agree that the Nesi and Prinstein 2015 study actually found there was no association between concurrent technology use and depressive symptoms after adjustments for confounding were made?
MS. EMMEL: Objection, foundation.
A. This is -- if you read the sentence, I can read it again if you want. Have found a number -- for example, a number of research studies have found that adolescent girls are more vulnerable to the

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negative effects of social media than boys, especially appearance-based social comparison.
BY MR. DAVIS:
Q. Okay. I've put in front of you Exhibit 13, which is the Nesi and Prinstein 2015 study that you cite, correct?
(Whereupon, Mojtabai-13, Using Social Media for Social Comparison and Feedback-Seeking: Gender and Popularity Moderate Associations with Depressive Symptoms, by Nesi et al, was marked for identification.)
A. It looks like it is. Let me just make sure that it is Nesi and Prinstein.
Nesi and Prinstein, this is...
(Sotto voce document review.)
BY MR. DAVIS:
Q. It's the same study, correct?
A. Correct.
Q. Okay. If you look at page 9 --
A. Okay.
Q. -- first paragraph, last sentence.
A. Page 9 --

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Q. It says: Interestingly, although depressive symptoms were positively correlated with concurrent technology use frequency, this association was no longer significant after accounting for other variables in the full regression model, as discussed below.
Correct?
A. That is what it says.
Q. So what these authors are saying is that the adjusted analyses found that there was no association between use of social media and depressive symptoms, correct?
A. That is what is implied, yes.
Q. It's not -- okay.
Not implied, it's stated, right?
A. Yes.
Q. And they also -- if you turn to page 430 -- can you look at page 10, paragraph 4.
So: --
A. Yeah. I need to come back to this.

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Q. Just a minute. I've got my question pending, okay?
A. Okay. Page 4. Yes.
Q. Page 10, paragraph 4. It says down at the bottom paragraph, under Discussion: Although results are preliminary and no strong conclusions about directionality can be made --
A. I'm sorry, which page you are --
Q. I'm on page 10.
A. Okay. Yes, on Discussion.
Q. Right?
A. Where on --
Q. Look under Discussion, second paragraph.
A. Second, okay.
Q. These authors say: Although results are preliminary and no strong conclusions about directionality can be made, given the concurrent nature of the data, the current investigation provides a valuable contribution to the literature.
Did I read that correctly?
A. Correct.

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Q. And by concurrent nature of the data, what they're talking about is that this is a cross-sectional study, correct?
A. Correct.
Q. Okay. And so they don't know -- they can't form strong conclusions about the directionality of whether social media use is leading to depressive symptoms or depressive symptoms are leading to social media use, correct?
A. Yeah, that's -- that is -- we talked about cross-sectional studies, and that's one of the limitations.
Q. Yep.
And let's go -- fair to say that this study cannot rule out that depressive symptoms actually led to social media use, social comparisons and feedback seeking?
A. Results --
MS. EMMEL: Objection, compound.
A. I'm sorry, where are we again?
BY MR. DAVIS:
Q. I'm asking you: Based upon the

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study itself, the overall findings of the study, do you agree that it cannot rule out that depressive symptoms actually lead to social media use, social comparisons and feedback seeking?
MS. EMMEL: Objection, compound, speculation.
A. That is -- so they talk about bidirectional associations, so it could be either way.
BY MR. DAVIS:
Q. Okay. And in terms of which one it actually is, this study doesn't provide the answer, correct?
A. This study does not -- from what I remember...
Q. Okay. Let me ask you the next question.
A. Yeah.
Q. You rely on the Liu study, right? That's 2022?
A. I want to make a comment about this study.
Q. Your counsel is going to be able to ask you whatever question they want

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to ask you.
A. Okay.
(Whereupon, Mojtabai-14, Time Spent on Social Media and Risk of Depression in Adolescents: A Dose-Response Meta-Analysis, by Liu et al, was marked for identification.)
BY MR. DAVIS:
Q. Here is Exhibit 14. This is the Liu, L-I-U, 2022 meta-analysis that you rely upon, correct?
A. Correct.
Q. This meta-analysis combined cross-sectional with longitudinal studies, correct?
A. Correct.
Q. And not all the --
A. Again, this is...
Q. So the studies that were being combined in this study included those that could establish temporality and those that could not, correct?
A. That is correct.
Q. Okay. And so in terms of -- because of that, that's a limitation of the

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study in terms of establishing whether there's actually a causal inference that can be drawn from that data, correct?
A. Are you talking about this specific meta-analysis?
Q. Yes.
A. Or you're talking about cross-sectional studies in general?
Q. I'm talking about this meta-analysis.
A. This meta-analysis, I think it is pretty strong because it has both cross-sectional and longitudinal studies, as you said.
Q. Well, I've asked you --
MR. DAVIS: Move to strike as nonresponsive.
BY MR. DAVIS:
Q. I asked you that because it combined longitudinal and cross-sectional data, that that's a limitation in terms of establishing whether or not there's actually a causal inference that can be drawn from the data, right?
A. That is not a cause for it

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being limited. That's not a reason for limitation, the fact that they include both cross-sectional and longitudinal study. That's -- yeah.

Q. So do you know -- you haven't taken the Liu 2022 meta-analysis and stripped out the cross-sectional studies to determine whether or not there's an increased risk from the longitudinal studies, have you?

A. I haven't, but -- no, I haven't.

Q. Okay. And in terms of the impact that the cross-sectional studies are having on the reported results from the Liu study, you haven't done that analysis, have you?

A. I didn't need to do that because if you look at Figure 2, they have separated the longitudinal and cross-sectional studies.

Q. Well, the longitudinal -- well, the longitudinal studies in Liu -- well, they don't -- they don't -- hold on a second.

Look at page 13 of 17, third paragraph.

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A. Yes.

Q. It says first -- it talks about -- this paragraph is talking about important limitations of the study, correct?

A. Right.

Q. Yes?

A. Yes.

Q. And it says: First, all included studies were observational, in which the results may be influenced by other potential covariates not yet considered. Hence, we cannot speak to causality in the interpretation of the results.

Did I read that correctly?

A. That's a boilerplate statement that you would find in a lot of your studies that we have here. They do that. They say that.

Q. It's not boilerplate. This is an accepted assessment of what you can do with the data, correct?

A. It's not the same degree of concern that you would have for a study that was only limited to cross-sectional studies, a meta-analysis, or just an individual

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cross-sectional study.

Q. Let me ask you this, Doctor: Do you accept that this is -- that when they say that we cannot speak to causality in the interpretation of the results, you accept that as a limitation of the study, correct?

MS. EMMEL: Objection, misstates the study.

A. I have my opinion on this study.

BY MR. DAVIS:

Q. I asked you if you accept that as a limitation of the study.

MS. EMMEL: Same objection.

A. I don't accept this as a major limitation of this study.

BY MR. DAVIS:

Q. You accept it as a limitation of the study?

A. As one of the limitations regarding the cross-sectional studies that are included, especially here.

Q. Well, they don't limit this statement to cross-sectional studies, do they?

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A. You asked my opinion.

Q. Do they limit this statement to cross-sectional studies?

A. They don't.

Q. Okay. And in terms of all the -- remember I showed you Exhibit 9?

A. Yes.

Q. That had all the quotes from cross-sectional studies about how causal inferences can't be made?

A. Uh-huh.

Q. Do you remember that?

A. That's what I mean by boilerplate.

Q. You think every one of those statements is just a boilerplate statement that the scientists picked out and put in there for no reason?

MS. EMMEL: Objection, vague.

A. No, it's not for no reason.

BY MR. DAVIS:

Q. It's an important limitation in the data itself, correct?

A. It is a limitation in general about cross-sectional studies. So when we

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submit articles to journals that have cross-sectional design, we are obliged to say that, that there is a limitation.
Q. You're -- you're obliged to say that because it's a recognition of what the cross-sectional data can and cannot do, right?
A. But they all talk to -- cross-sectional studies do talk to causality. That's the point I want to make. It's not that they're not -- you can't make any causal inferences based on cross-sectional studies.
Q. You're obliged to say statements along the lines of what is in --
A. Yeah.
Q. -- Exhibit 9 because it's a recognition of what cross-sectional data can and cannot do, correct?
A. It's a statement of their limitation, potential limitations.
Q. Right.
And if you look at those statements on Exhibit 9, they don't say it's a potential limitation, do they?
A. Some of them may actually say.

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If they don't, it is, in my opinion, it's a potential limitation because it varies depending on what confounding variables they adjust for.
Q. Did any study that you're aware of say that causation can be established using cross-sectional data, any study that you relied upon?
A. Not even a longitudinal study or experimental study would say that the causation can be established based on our study. This is not -- that's not what we do in science.
Q. All right. Look at the -- page 53.
Let me back up for a second.
A. Sure.
Q. Are you aware of any study of social media use in patients with diagnosed psychiatric disorders in which use of social media made the psychiatric disorder worse in the patients in the study?
A. Can you -- this was a lot of elements. Can you repeat it?
Q. Sure. Sure.

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Are you aware of any study of social media use in patients with diagnosed psychiatric disorders in which use of social media made the psychiatric disorder worse --
MS. EMMEL: Objection, compound.
BY MR. DAVIS:
Q. -- in the patients who were involved in the study?
MS. EMMEL: Objection, compound.
A. I believe I have some studies that I refer to in the section on preexisting conditions.
BY MR. DAVIS:
Q. What are the names of those studies?
Remember, we're talking about diagnosed psychiatric disorders and that the social media use made those psychiatric disorders worse.
A. That's why I want to look at it, to refresh my memory.
So --
(Technical recess requested by

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the stenographer.)
MR. DAVIS: Let's go off the record and fix it, and that will let Dr. Mojtabai find his study, if that exists.
THE VIDEOGRAPHER: We're off the record at 3:24 p.m. That's the end of Media 7.
(Recess taken, 3:24 p.m. to 3:28 p.m. CDT)
THE VIDEOGRAPHER: We're back on the record at 3:28 p.m. This is the beginning of Media 8.
BY MR. DAVIS:
Q. What page are you on, Dr. Mojtabai?
A. 54.
Q. Okay. Let me ask you a question.
Did you find a study in your report --
A. Yeah.
Q. -- that assessed diagnosed psychiatric disorders in which social media use made the diagnosed disorder worse?

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A. I found one study, Mullen, Dowling and O'Reilly 2018. In total, 299 young people.

So they included -- so they were people who were receiving care. They were hospitalized adolescents, and compared them to community-dwelling participants who screened negative for mental health problems, and those who screened positive and those attending inpatient or outpatient mental health services had more problematic social media use and reported more cyber-victimization.

Q. Okay. The study that you're identifying, that is a survey that was done of patients, correct?

A. Well, compared patients and nonpatients --

Q. Correct.

A. -- it meant to do.

Q. Yes.

And this survey is cross-sectional, right?

A. It was cross-sectional, yes.

Q. Okay. Can you identify any

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longitudinal or experimental study that shows that if someone who has a diagnosed psychiatric disorder uses social media, that the diagnosed psychiatric disorder gets worse?

MS. EMMEL: Objection, compound.

A. So the number of issues there that -- first of all, everybody nowadays, almost every kid, whether psychiatrically or not, uses social media. So I don't know how you can identify kids who use and don't use social media. It's not an exposure that can be assigned randomly to kids.

So there is -- there's problem in the -- this hypothetical scenario of this study.

BY MR. DAVIS:

Q. I'm just asking: Can you identify any longitudinal or experimental study on social media where the study assessed diagnosed psychiatric disorders and the use of social media made those psychiatric disorders worse?

MS. EMMEL: Objection, asked

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and answered.

A. Yeah, I cannot, off the top of my head, think of any.

BY MR. DAVIS:

Q. Okay. In respect to Section 4.1 and 5.8 of your --

A. 4.8 and?

Q. 4.1 and 5.8.

Are there any longitudinal studies that are identified at either of those sections?

A. Adolescents aren't equally vulnerable.

(Clarification requested by the stenographer.)

A. So your section -- this Section 4.1 is: Adolescents are not equally vulnerable to the adverse effects of social media.

And 5.8, you said, correct?

BY MR. DAVIS:

Q. Yeah. Let's take 4.1 since you've got it in front of you.

A. Okay.

Q. In Section 4.1, were you --

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which is entitled "Adolescents are not equally vulnerable to the adverse effects of social media."

My question to you is: Can you identify any longitudinal study that's included in that section?

A. I'm looking to see if there is any studies in this section.

(Document review.)

A. I don't -- I'm not sure about that Ontario Student Drug Use and Health Survey, but I assume this is a cross-sectional one.

BY MR. DAVIS:

Q. Okay. Are you aware -- so are you able to identify any longitudinal study in Section 4.1?

A. As I said, without looking at the individual studies, I cannot.

Q. You don't know of one today, do you?

A. I cannot identify any one of these studies, whether they are longitudinal or not.

Q. Okay. Can you identify any

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study -- any experimental study in Section 4.1 that's an experimental study?
A. This is not a section that talks about exposure being randomized or exposure -- differences in exposure. It's talking about vulnerability. So it's not relevant, but I don't see any.
Q. Okay. Let's turn to 5.8.
This is a section that's entitled "Youth with preexisting mental health problems are openly vulnerable to adverse effects of social media."
Do you see that?
A. Yeah.
Q. Can you identify any longitudinal study that you discuss or analyzed in this section of your report?
A. Again, without looking at these studies with that eye, I cannot.
Q. You're not aware of one today, are you?
A. I'm not.
Q. And are you aware of any experimental study that you identify or discuss in Section 5.8 of your report about

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youth with preexisting mental health problems being vulnerable to adverse effects of social media?
A. I don't think it's relevant for this section, experimental designs, because it's talking about impact of preexisting mental health conditions. You cannot randomly assign that.
Q. So no experimental studies discussed in this Section 5.8, correct?
A. I don't see any. I don't see any, correct.
Q. Okay. So fair to say that sitting here today, all the studies that you discuss in Section 4.1 and Section 5.8 of your report are cross-sectional studies or surveys, correct?
A. It looks like that, yes.
Q. Okay. Let's take a look at...
(Whereupon, Mojtabai-15, Does TikTok contribute to eating disorders? A comparison of the TikTok algorithms belonging to individuals with eating disorders versus healthy controls, by Griffiths et al, was marked for

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identification.)
BY MR. DAVIS:
Q. I made a mistake, Dr. Mojtabai. Let me put an exhibit on that. This is Exhibit 15, and this is an article by Griffiths entitled: Does TikTok contribute to eating disorders? A comparison of the TikTok algorithms belonging to individuals and eating disorders versus healthy controls.
Do you see that?
A. Right.
Q. Right?
Now, you discussed this report on page -- you discussed this article on page 54 of your report, correct?
A. Let me go there.
Yeah.
Q. If you look at Table 6 -- well, let me back up.
Go to page 9, right-hand column, Section 4.3.
A. 4 point -- can you repeat what --
Q. Sure.
Go to page 9 --

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A. Right, yes.
Q. -- Section 4.3, where it says: Other findings.
A. Right.
Q. All right?
And if you go to the second-to-the-last sentence, it says that: Notably, we found no associations between the number of TikTok videos delivered and eating disorder symptoms, and no difference in self-reported frequency of TikTok use between users with eating disorders and healthy controls.
Correct?
A. Let me find that. I'm sorry. Notably, we found...
(Document review.)
A. Yes.
BY MR. DAVIS:
Q. Okay. I read that correctly?
A. Yes.
Q. And so, in other words, the volume of the videos and the frequency by which they were viewed were no different between those with eating disorder symptoms

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and those who did not have eating disorder symptoms, correct?
A. Right.
Q. And it was, rather, what the individuals were motivated to do with what they viewed, correct?
A. Repeat what you said.
Q. Yeah.
It was, rather, what the individuals were motivated to do with what they viewed that was a difference in the study, correct?
MS. EMMEL: Objection, speculation.
A. It's what they were getting, the messages or the videos they were getting that is different.
BY MR. DAVIS:
Q. So in terms of -- yes.
What they were getting was different in terms of what they were seeking, the information they were seeking on the platforms, correct?
MS. EMMEL: Objection, foundation, speculation.

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A. Either actively seeking or the algorithm might identify that they are lingering on one type of video or interacting with that video more, giving likes, et cetera, to it.
BY MR. DAVIS:
Q. And between those two potentials, you don't know which one it was, do you?
A. I don't.
Q. Okay.
A. I haven't --
Q. Now, you also realize that what they're -- what they're -- the study is assessing how people are looking at videos and responding to what they're seeing and hearing on the videos that they view, correct?
MS. EMMEL: Objection, speculation, foundation.
A. Can you repeat your question?
BY MR. DAVIS:
Q. Yeah.
This study is assessing how individuals with eating disorders are looking

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at videos and responding to what they're seeing and hearing on the videos, correct?
MS. EMMEL: Objection, foundation, speculation.
A. That is the exposure of the study. What they're getting is the outcome of the study.
BY MR. DAVIS:
Q. Okay. And -- yes.
And the authors in this study, if you go to the Limitations section, which is on page 10 --
A. Yes.
Q. -- under Study Limitations, if you go six lines down it says: Third, our study is cross-sectional and nonexperimental and therefore does not permit causal claims.
Do you see that?
A. I see.
Q. You agree with that, correct?
A. Again, I think this study is a pretty strong study. I don't agree with the claim they make that it doesn't support causal claims. I think it's one of those boilerplate limitations that we're always,

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when we submit to journal article -- journals, we are asked to put in.
Q. So your view is that these researchers put something in that's boilerplate that they didn't really believe?
A. They may have believed it. I don't believe it. You asked my opinion. My opinion is this is a pretty strong study.
Q. And while you say that it's a strong study, these researchers who crunched the data, analyzed it, assessed it, they said this -- our study is cross-sectional and nonexperimental and, therefore, does not permit causal claims, right?
That's what they conclude?
A. That's what they say, but that's not what I think about this study.
Q. Yes.
A. This study is looking at -- it's actually -- that's where the cross-sectional studies I said it's contextual. You have to look at the context.
This is a cross-sectional study where it's examining the responses of these participants and the outcome is the videos

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they're seeing.
So it is -- it has a built, sort of like longitudinal, you may call it, element in it, because the responses they're getting is not cause -- cannot cause -- it can't be reverse causation.
Q. Show me where in the study these researchers say that there's an element of a longitudinal analysis?
A. That's my opinion, that's not what they're saying.
Q. Right. They're saying the exact opposite, right?
A. I didn't say that --
Q. They're saying the exact opposite, right?
A. No.
Q. They're saying it's cross-sectional, not longitudinal, right?
A. Cross-sectional is not --
MS. EMMEL: Objection, argumentative.
THE WITNESS: Sorry, go ahead.
MS. EMMEL: Go ahead.
A. Cross-sectional is not opposite

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of longitudinal.
BY MR. DAVIS:
Q. They're saying it's cross-sectional and not longitudinal, right?
MS. EMMEL: Objection, asked and answered, harassing.
A. They're saying it's cross-sectional. They don't say anything about longitudinal.
BY MR. DAVIS:
Q. All right. Now, with respect to all the statements that are in Exhibit 9 that talk about how cross-sectional data cannot be used to make a causal inference, is it your testimony, Dr. Mojtabai, that every one of those researchers in these studies is just putting in a boilerplate statement that they don't believe in?
A. I didn't say that. I said there is a boilerplate statement that, when people submit a cross-sectional study to a journal, they're asked to put in.
Q. Well, some of them are not -- some of them -- you have no evidence that any journal asked them to put in as opposed to

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them actually putting it in themselves because they believed that's what the limitation of the data was, correct?
A. I don't know if it is what they believed or what they were asked by the journal or the reviewers. The reviewers sometimes ask you to put in a statement like that.
We see it in this study, very clearly in this study.
Q. Would you agree that typically what happens at a journal is that if a statement like what's in Exhibit 9 is not put in a cross-sectional study that's submitted for publication, that the journal reviewers will say you need to include this because this is a limit --
MS. EMMEL: Objection --
BY MR. DAVIS:
Q. -- a limitation of this type of data?
MS. EMMEL: Objection, speculation.
A. Yeah, it is speculative, but from my own experience, I can talk about

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that. It happens a lot that the reviewers ask for that.
BY MR. DAVIS:
Q. Okay. If you look at the -- one of the other limitations, it's the number 7 one down the list. And it says --
A. Number 7?
Q. Yeah. 7.
A. On this page here?
Q. Yeah.
A. Yeah. Okay.
Q. On page 10, right-hand side.
A. 7?
Q. 7: Most participants in our eating disorders group are diagnosed with anorexia nervosa, and our findings may not generalize to other eating disorders, particularly those that do not involve body image concerns; example, avoidant and restrictive food intake disorder.
Did I read that correctly?
A. Can you point me here?
Q. Yes. It's right there.
A. 7, okay.
Q. Did I read it correctly?

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A. Correct.
Q. Right.
And so what they're saying is another limitation of the study is that it -- it's not certain that it actually generalizes to other eating disorders because of how many patients in the study actually had anorexia nervosa as opposed to some other eating disorder, right? Right?
A. Yeah.
Q. And you agree with that?
A. Again, it's a -- it could -- it could apply to them, generalize to them or not, but it's a -- it's an empirical question.
Q. And I'm just simply asking if you agree that -- with the limitation that this study -- this study's results, it's not certain that it generalizes to patients other than those with anorexia nervosa?
A. It may or may not.
Q. You don't know which one?
A. Yeah.
Q. Okay. All right.
Dr. Mojtabai, let's turn to

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page 75 and 76 of your expert report.
A. Yes.
Q. If you look at page -- at the bottom of the page, you discuss your overall assessment of the literature that you reviewed, correct?
A. You mean the last bullet point: In studies examining --
Q. Yeah.
A. -- the association between quantity of exposure and -- to social media, et cetera?
Q. Yeah. All my point is: On this page, on pages 75 through 76, you're just summarizing your review and assessment of the literature that you analyzed, correct?
A. Correct.
Q. Now, down at the bottom of page 75, you talk about how there's a dose-dependent relationship that exists between the quantity of exposure to social media and mental health problems.
Do you see that?
A. Yeah.
Q. You rely on three studies to

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support that claim, right?
A. The dose-response -- the dose-dependent relationship, yes.
Q. Okay. One of those is the Riehm study, right?
A. Correct.
Q. The other two are Sampasa-Kanyinga and Lin, L-I-N, correct?
A. Correct. Correct.
Q. Okay. Those are the three studies that you identify in your report as supporting a dose-response relationship, correct?
A. In addition to the Liu meta-analysis, the sentence goes on to say that.
Q. You are correct. You do also identify the Liu 2022 study, meta-analysis, correct?
A. Yes, correct.
Q. Okay. So we have four articles that you rely upon in this case for dose-response relationship, correct?
A. Correct.
Q. Okay. So let's talk about the

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Sampasa-Kanyinga, okay, and the Lin study.
MR. DAVIS: Sorry, I'm going to get a little organized here.
(Whereupon, Mojtabai-16, Use of social media is associated with short sleep duration in a dose-response manner in students aged 11 to 20 years, by Sampasa-Kanyinga et al, was marked for identification.)
BY MR. DAVIS:
Q. I'll give you what's been marked as Exhibit 16, which will be the Sampasa-Kanyinga.
Is it okay if I just say Sampasa so it's a little bit easier to talk about?
A. Sure. Sure.
Q. Okay. This was a cross-sectional study, correct?
(Sotto voce document review.)
A. Looks like that, yes.
BY MR. DAVIS:
Q. And this study only assessed sleep disorders, correct?
A. It's looking at social media

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and sleep duration.
Q. Right.
So it only looked at sleep duration, correct?
A. Correct.
Q. So it didn't look at any other outcome, including no psychiatric disorder, correct?
A. I'm reading it.
Q. That was a terrible question.
It didn't look at any other outcome, including any type of psychiatric disorder, correct?
A. It adjusted for self-rated mental health, substance use, immigration status, racial/ethnic group, et cetera.
Q. Those were adjusted for confounders, right?
A. Correct.
Q. Okay. The psychiatric disorder was not an outcome, correct?
A. Correct.
Q. Suicidal thoughts or behavior was not an outcome, correct?
A. Not in this study, I don't see.

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Q. Okay. So, in fact, these authors specifically say, if you turn to page 6 --
A. There's no 6.
Q. Yeah, you're right. Just give me a second.
A. Sure. I can count, one, two, three, four, five, six.
Q. If you look on page 698, right-hand column.
A. Yes.
Q. Okay. You see there's a paragraph that says: Strengths of this study?
A. Yes.
Q. And then later on, down about seven lines, it says: There are also several limitations worth mentioning.
Did I read that correctly?
A. Yes.
Q. And then it says: First, the cross-sectional nature of our study precludes any causal inference about the observed association between the use of social media and sleep duration.

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Correct?
A. Correct.
Q. You agree with that limitation, right?
A. I would agree.
Q. Yep.
And so this -- in other words, this study is saying it doesn't know which -- whether sleep is leading to more social media use or social media use is leading to less sleep, correct?
A. It is correct literally, however, it's not plausible. There's an issue of plausibility.
What is more likely to be the cause of the other is sleep -- I can't plausibly think of a scenario where shorter sleep would lead to more use of social media.
MR. DAVIS: I move to strike as nonresponsive after "It is correct literally."
BY MR. DAVIS:
Q. Let's talk about the Liu, L-I -- oops, Lin. Let's talk about Lin.
A. Do you have the paper?

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Q. I do. Just a second.
Let me look at -- let me give you this.
(Whereupon, Mojtabai-17, Association Between Social Media use and Depression Among US Young Adults, by Lin et al, was marked for identification.)
BY MR. DAVIS:
Q. This is Exhibit 17. This study is another cross-sectional study, right?
A. It appears so, yes.
Q. Yep.
And if you look at page 6, which is actually page 329.
A. Okay.
Q. Second paragraph -- oops. Let me find it here. Oh, it's actually the third paragraph -- the second full paragraph. Well I'm not finding the quote. Anyway, let's go to the next question.
Do you agree that because it's a cross-sectional study, the directionality of association is not confirmed?
MS. EMMEL: Objection,

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foundation.
(Sotto voce document review.)
A. In general, yes, I would -- with mood, mood symptoms --
BY MR. DAVIS:
Q. Okay.
A. -- there could be bidirectional relationship.
Q. Okay. So -- and this study is not providing data on anxiety disorders or other psychiatric disorders or symptoms other than symptoms of depression, correct?
A. It's using the Patient-Reported Outcome Measurement Information System, PROMIS, which is NIH measure for depression, and validated against a number of other measures.
MR. DAVIS: I object, move to strike as nonresponsive.
BY MR. DAVIS:
Q. I was simply asking that this study is focused on symptoms of depression, right?
A. It appears to me that it is, yes.

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Q. It's not assessing any other psychiatric disorder or symptoms of a psychiatric disorder, correct?
A. It appears so.
Q. And it's not assessing suicidal thoughts or behavior either, is it?
A. No, I don't have the PROMIS in front of me, so I cannot -- I cannot tell you about if there are questions about suicidal ideations included in PROMIS or not.
Q. Well, if you look under Measures --
A. Yes.
Q. -- under -- on page 324, suicidal ideation or thoughts or behavior is not included, is it?
A. So as I said, like they mentioned PHQ-9, PHQ-9 has one item. Question No. 9 asks about suicidal ideation.
Q. There's no analysis in this article speaking to suicidal thoughts or behavior, is there, Dr. Mojtabai?
A. That is my understanding, yes.
Q. Okay. Let's look at the Liu study.

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A. Do you have a copy?
Q. I think we already have it marked as an exhibit.
A. Yes, yes, you're right. I have a lot of stuff in front of me. Yes. Liu, yes.
Q. Okay. The dose-response -- let's turn to page 11 of 17.
A. Yes.
Q. Right? Are you there?
A. Yes.
Q. And that's -- that contains a section called 3.5, Dose-Response Association between TSSM -- which is time spent on social media -- and Risk of Depression.
Do you see that?
A. Yes.
Q. Okay. So they identify five studies that were included in the dose-response analysis, correct?
A. Right.
Q. And if you look at -- you agree that those are identified by numbers, 6, 7, 19, 20 and 54, correct?
A. Yes, the studies. Yes,

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correct.
Q. And you know from looking at those studies that every single one of those studies is a cross-sectional study, correct?
A. I have to look at each one of them, but --
Q. Well, let's look at them.
Because they're identified in the study.
A. Yes.
Q. Look, I'm going to point them out. Here, let me see your paper, and I'll make this fast.
A. Okay.
Q. Let me see if I got them all...
(Document review.)
BY MR. DAVIS:
Q. Okay. If you look back at the reference chart, okay?
A. Yes.
Q. I've highlighted the studies that are identified as being in the cross-sectional -- excuse me, in the dose-response analysis, right?
(Sotto voce document review.)

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MS. EMMEL: Could you identify the page, please?
MR. DAVIS: It's on pages 14 and 15.
MS. EMMEL: Thank you.
A. So I see here, the Kelly study is Social Media Use and Adolescent Mental Health: Findings from the UK Millennium Cohort Study. That might be an actually --
BY MR. DAVIS:
Q. Well, look at table -- go back to Table 1 in the study.
A. Okay. That was the Kelly.
Q. Right.
Kelly is identified as a cross-sectional study, correct?
(Sotto voce document review.)
A. Yeah, I don't know without looking at it how they have analyzed it or whether it is correct -- correctly noted, because I know that the Millennium study is a longitudinal study. I know that.
BY MR. DAVIS:
Q. It's identified as a cross-sectional study in this analysis,

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correct?
A. In this study, it is -- it has a CS, yes.
Q. Okay. And so are the other ones that were identified with -- number 6, right? That's the Twenge article?
(Sotto voce document review.)
BY MR. DAVIS:
Q. That's a cross-sectional study based on Table 1, too, right?
(Sotto voce document review.)
A. I assume so. I -- yeah. Twenge is number 6. Let's see.
BY MR. DAVIS:
Q. Right?
A. Twenge, cross-sectional -- yeah, Twenge is also.
Q. Correct?
A. They have identified them as such.
Q. Okay. And then if you look at the Tamura, which is number 17, that's also a cross-sectional study.
A. From Japan. Yes.
Q. Right?

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A. They have identified it as a cross-sectional study.
Q. And then we've already talked about Kelly being identified as a cross-sectional study. That's -- Kelly is number 19 in the reference, right?
A. Kelly is number 19 in that, yes. Kelly, I can see this.
Yeah, it's identified as a cross-sectional study, but it might be because it's based on the Millennium. I'm not sure.
Q. Okay.
A. But I trust you.
Q. And so four of the five studies are identified as cross-sectional studies in this paper, correct?
A. Okay.
Q. Right?
A. Right. The four that you talked about right now, right.
Q. Right.
And then they also identify number 54, which is the Ma study, correct?
A. Yes.

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Q. And Ma is identified as a longitudinal study in Table 1, correct?
A. Correct.
Q. Okay. Let's take a look at Ma. We'll mark that as Exhibit 18.
(Whereupon, Mojtabai-18, The association between screen time and reported depressive symptoms among adolescents in Sweden, by Ma et al, was marked for identification.)
MR. DAVIS: I think I gave you two.
THE WITNESS: Two, yes.
MR. DAVIS: There you go. Okay.
BY MR. DAVIS:
Q. Look at last -- look at the Discussion section.
A. Discussion section, yes. Uh-huh.
Q. And if you look at page 777, the second-to-last paragraph on that page, do you see they say, quote: Our study was cross-sectional, therefore we could not determine the direction of effects.

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Do you see that?
A. Uh-huh.
Q. Yes?
A. I see that.
Q. So there's no question that the Ma study was cross-sectional, right?
A. They identify their study as cross-sectional.
Q. Right.
And so every single one of the studies that you used -- strike that.
Every single one of the studies in the Liu dose-response analysis is identified as a cross-sectional study, correct?
A. I wouldn't say so. I mean, I'm referring to Figure 2. First of all, it's not only five studies in Liu --
Q. Dr. Mojtabai, you've got to follow my question.
Look at -- the dose-response analysis only had five studies, right? We already went over that.
MS. EMMEL: Objection, argumentative.

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A. So here it says: Figure 2, Forest plot of the association between time spent on social media and risk of depression.
So they're looking at time.
BY MR. DAVIS:
Q. Dr. Mojtabai, look back at page 11.
A. Okay.
Q. You see Section 3.5 that says: Dose-Response Association between Time Spent on Social Media and Risk of Depression?
Do you see that section?
A. Uh-huh.
Q. Yes?
A. Yes.
Q. And it says: Five studies were included for the dose-response analysis.
Did I read that correctly?
A. Correct.
Q. And then those five studies, we just went over, correct?
A. Right.
Q. So the dose-response analysis didn't include longitudinal studies, did it?
A. Unless they have made a mistake on the Kelly study as well. You identified one error. It's possible they have made an error --

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Q. Sitting here today, do you know whether or not there's any longitudinal studies included in this dose-response analysis?
A. I don't.
Q. Okay. Before today and me showing you these studies and this information, did you know that only cross-sectional studies were included in the dose-response analysis in the Liu 2022 paper?
A. First of all, I -- this is looking at -- so if you go to Section 3.2, they're talking about association between time spent on social media and depression risk.
So --
Q. Dr. Mojtabai, my question is simply: Before today and me showing it to you, did you know that all five studies in the dose-response analysis were, in fact, cross-sectional studies?
MS. EMMEL: Objection, argumentative.

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A. Yeah, what I see -- I have to look more carefully at what they mean by dose-response.
BY MR. DAVIS:
Q. Did you know, before me asking you these questions and showing you this information, that all five studies included in the dose-response analysis were cross-sectional?
MS. EMMEL: Objection, argumentative.
A. As I said, I don't know if they're -- as you identified one study. I don't know if their identification of Kelly study as a cross-sectional. I would have thought that this is a longitudinal study.
BY MR. DAVIS:
Q. So before today, you thought all five studies were longitudinal?
A. Not all five, but the Kelly one.
Q. Okay. So you -- so you knew that four of the five were cross-sectional before today? Or you didn't know any of them

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were cross-sectional before today?
A. No, I actually believed one of them was longitudinal.
Q. Okay. So the dose-response analysis that's in the Liu 2022 paper --
A. Yeah.
Q. -- doesn't know which direction the association is going, correct?
A. This study, they cross -- what you showed me is dose-response analysis. That's different than looking at the association. It's looking at whether the association is a dose-response-type association or not.
So it's not even asking that question that --
Q. I'm not asking you about the overall analysis, Dr. Mojtabai. You've got to focus on my question.
I'm asking you about the dose-response analysis in Liu.
A. Right.
Q. That analysis cannot establish which direction of the association for the dose-response analysis, correct?

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MS. EMMEL: Objection.
A. To the extent that these cross-sectional studies might have limitations in establishing direction of causation, yes, I would agree with you.
BY MR. DAVIS:
Q. You agree with me. Okay.
Fair to say that all the studies in the dose-response analysis in Liu could not definitively rule out that the mental health outcome study was why the study participants were using social media?
MS. EMMEL: Objection, compound, speculation.
A. What's your question?
BY MR. DAVIS:
Q. Yeah. The dose-response analysis that was done in Liu cannot rule out that the reason why the study participants in those five studies were using social media was because they had depressive symptoms that then led to social media use, right?
MS. EMMEL: Objection, compound, speculation.
A. Again, I go back. This -- the

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purpose of it was to establish whether the relationship is dose-response. It wasn't a causal question that they're asking.
BY MR. DAVIS:
Q. Right.
But this analysis, each of the studies in this analysis doesn't establish temporality, fair?
A. The studies, as far as I know, with the proviso that I haven't seen Kelly's study myself --
Q. Okay.
A. -- firsthand, yes, I agree with you.
Q. Okay. And, in fact, if you look at the Liu study -- we've already gone over that. Okay.
So you're not claiming that the Kampasa [sic] study, the Lin study or the Liu study establish a dose-response relationship for anything other -- other than symptoms of depression, correct?
A. Dose-response, that's the question they're actually looking at, dose-response association with symptoms of

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depression.
Q. Correct. I just want to make sure you have my question in your mind.
A. Okay.
Q. Because we've talked about the Kampasa -- excuse me. We've talked about the Sampasa study, we've talked about the Lin study, and we've talked about the Liu meta-analysis, correct?
A. Correct.
Q. And you're not claiming that those studies, individually or combined, establish a dose-response relationship for anything other than symptoms of depression, correct?
A. I have seen the evidence for symptoms of depression.
Q. Yeah. For example, those -- you're not claiming that those three studies establish a dose-response relationship for anxiety-related disorder and symptoms of anxiety-related disorders, suicidal thoughts or behavior, or eating disorders or BDD, fair?
A. So you ask about those specific

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studies. The symptoms that I saw in these studies that you showed me, they were only looking at depression.

Q. And none of the others that I mentioned, correct?

A. The other ones I haven't seen specifically. It's possible they have other measures that I haven't seen so --

Q. I'm only asking what your opinions are in the case, okay?

A. Okay.

Q. When it comes to a dose-response claim -- excuse me.

When it comes to your dose-response opinions in the case, you're not claiming those three studies or articles establish a dose-response relationship for anything other than symptoms of depression, right?

A. Based on those studies, I don't make that claim.

Q. Okay. Now -- and the other study that you -- the only other study we haven't talked about is the Riehm 2019 study, correct?

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A. Correct.

Q. That study only looked at symptoms of depression or internalizing, slash, externalizing symptoms, correct?

A. Correct. Correct.

Q. That study -- you're not claiming the Riehm 2019 study establishes a dose-response relationship between anything other than symptoms of depression, correct?

A. Right.

Q. Okay.

A. And social media -- so dose-response is the dose of social media use and its association with depressive symptoms. I just may clarify that.

Q. Okay. Now, let's talk about the Riehm study.

A. Sure.

MR. DAVIS: Are you doing okay? Do you need a break or anything?

THE WITNESS: No, I'm doing fine.

MR. DAVIS: Just give me a second.

THE WITNESS: Sure.

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(Whereupon, Mojtabai-19, Associations Between Time Spent Using Social Media and Internalizing and Externalizing Problems Among US Youth, by Riehm et al, was marked for identification.)

BY MR. DAVIS:

Q. Dr. Mojtabai, I'm going to hand you what's marked as Exhibit 19, which is a copy of the Riehm study.

A. Yeah.

Q. Now, this is an article that you were a coauthor on in 2019, correct?

A. Correct.

Q. And you had an active role in drafting this manuscript, right?

A. Correct.

Q. You made sure that it was accurate and truthful in every respect, correct?

A. I did my best.

Q. Right.

You don't know of any inaccuracies in the article, do you?

A. I'm not aware of any.

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Q. Okay. And you made sure that you chose the words that you chose because you wanted to be careful about how your study was described and to make sure it was accurately described, right?

A. To the extent I recall, yes.

Q. That's your normal practice, right?

A. Yeah.

Q. So let's look at -- you're using -- in this study what you did is you used internalizing and externalizing symptoms as a proxy or substitute for symptoms of depression, correct?

A. Well, externalizing symptoms are, by themselves, a sort of construct that is not necessarily related to depression. It's more related to substance use, rule-breaking behavior, conduct disorder.

Q. So the externalizing symptoms may or may not be related to symptoms of depression, correct?

A. That's correct.

Q. And in terms of internalizing symptoms, do you know, in terms of your --

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strike that.
In terms of internalizing symptoms versus symptoms of depression, do you know what the rate of error is between the two, the difference between the two?
A. What is rate of error again? Define it.
Q. Sure.
Out of the people who have -- individuals who have externalizing symptoms --
A. Right.
Q. -- that actually have symptoms of depression --
A. Externalizing and depression?
Q. Uh-huh.
A. I don't know off the top of my head, no.
Q. Okay. So, for example, if you have a patient population -- excuse me.
If you have a group of individuals that have internalizing symptoms, some of that group actually doesn't have symptoms of depression, right?
A. You're talking about

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internalizing symptoms now?
Q. Yes.
A. Oh, I thought you were talking about the externalizing.
Q. Let me ask the question so you -- it's fresh in your mind, okay?
A. Yes.
Q. With respect to internalizing symptoms --
A. Right.
Q. -- and how that group of patients who has that, how many of those actually have depressive symptoms?
A. Depressive symptoms, again, because you're talking about symptoms, you can't say how many. You can ask how -- what's percentage of those who have significant internalizing symptoms also have depressive symptoms or meet the criteria for depression. That's the way usually we ask the --
Q. Okay. So let me see if I understand that.
So for those patients who have externalizing symptoms --

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A. Externalizing?
Q. Thank you for correcting me.
A. Sure.
Q. Those patients who have internalizing symptoms --
A. Right.
Q. -- some of those patients will not have actual symptoms of depression, right?
A. With any measure, whether it's depression or internalizing symptoms, if you cross the two measures, there will be some people who meet the criteria based on one measure and not the other, and vice versa.
Q. What's the percentage of overlap between internalizing symptoms and symptoms of depression?
A. And depressive symptoms.
I can't tell you off the top of my head, but this is a validated instrument that we use, so it's possible to find it in the literature.
Q. Is it fair to say that that overlap could be anywhere between 30 and 70%?
MS. EMMEL: Objection,

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speculation.
A. Yeah, it is speculation. I --
BY MR. DAVIS:
Q. Do you know the percentage?
A. Not off the top of my head.
Q. Okay. In terms of the patients in your -- in the Riehm study who had internalizing symptoms, do you know how many, if any, ever developed a diagnosed depressive disorder or other psychiatric disorder?
MS. EMMEL: Objection, compound.
A. I -- off the top of my head, again, I don't know. This is a cohort study, the PATH cohort study that has been following these kids in life, so it's possible to -- that there are reports about association of internalizing symptoms with future psychopathology.
BY MR. DAVIS:
Q. So, for example, in the Riehm study, you can't look at the number of patients who had internalizing symptoms that you equate with symptoms of depression and tell us how many of those patients actually

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developed a clinically significant or diagnosed condition, can you?
A. It is possible in the PATH, again, study to do that, but we haven't looked at it as we did here.
Q. Let me ask you a broader question.
A. Okay.
Q. About all the studies that you've looked at that assessed symptoms of depression or symptoms of anxiety or eating disorder symptoms --
A. Right.
Q. -- is there any way, looking at that -- those studies, to be able to definitively say, okay, of those patients who had those symptoms, they actually went on to develop an actual clinically significant disorder?
MS. EMMEL: Objection, vague and ambiguous.
A. There are studies in -- population studies in epidemiology, in psychiatric epidemiology, that follow adolescents with internalizing symptoms and

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externalizing symptoms to see what percentage of them develop, as you say, diagnosable or more severe forms of mental health problems.
And there is a strong correlation. There is a study by Rose and Day that says there is a strong correlation between mean on these questionnaires and the number of people who develop significant -- clinically significant disorder later on.
BY MR. DAVIS:
Q. Yeah, but I'm not focused just on Riehm. I'm focused on all the studies that you've looked at for your assignment as an expert in this case.
Is there any way to look at those studies and say, you know what, I see that they are -- there's people who are reporting increased symptoms of anxiety or depression or perhaps an eating disorder or suicidal thoughts or behavior.
Is there any way to go on and then determine, out of those people, how many actually developed a clinically significant disorder from social media use?
MS. EMMEL: Objection, asked

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and answered.
A. You're saying is there any way of doing this, and as I mentioned, this is, like, for example, a cohort study, so it's possible to go into the data, future waves of the data, and look to see what percentage of these children who had increased internalizing symptoms or externalizing symptoms later on developed problems.
BY MR. DAVIS:
Q. But for any of the studies that have been done on social media, has that analysis actually been done?
A. I'm not aware of any specific studies that did that.
Q. Okay. All right. So there are going -- let's turn back to Riehm and internalizing symptoms.
There are going to be patients who have significant internalizing symptoms that will be false positives in terms of whether or not they actually have symptoms of depression, correct?
A. That is correct.
Q. Okay. And that's also going to

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be true for any anxiety symptoms, right?
A. That is correct both ways. You could have false positive, false negative.
Q. And you don't know what the percentage of that is for either depression or anxiety for the Riehm study, do you?
A. I'm actually looking at the outcomes to see if the GAIN-SS, which is a screening measure intended to identify a probable mental health disorder, what are the, maybe, psychometric properties of this specific instrument in -- in those outcomes.
And I think -- I don't have it here, but it's -- it's referenced, reference number 18.
Q. Okay. Do you -- again, do you know what the percentage is for either depression or anxiety, from the Riehm study, of those who had false positives or false negatives?
A. I do not off the top of my head.
Q. Okay. Did you -- was that data even collected for Riehm?
A. Not for Riehm.

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Q. Okay.
A. But the measure is validated and that's --
Q. Now, you --
A. -- the Dennis study, yeah.
Q. You claim that this -- that the Riehm study shows a dose-response relationship between use of social media and depressive symptoms, correct?
A. Correct.
Q. Doctor, the words "dose-response" don't appear anywhere in the Riehm article, do they?
A. They don't need to appear. You can see it in the Figure 2 and in the analysis.
Q. Doctor --
A. Table 3.
Q. -- I want you to turn to the camera and I want you to look right into the camera, and I want you to show the jury where you actually said, in the Riehm article, that there's, in fact, a dose-response relationship that show in this study.
MS. EMMEL: Objection, asked

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and answered, harassing.
A. So if you read the paper, it says: Compared with adolescents who did not use social media, the use of social media for more than 30 minutes per day was associated with greater risk of internalizing symptoms alone. And there is a comparison with less than 30 minutes, and that is their risk ratio is 1.3.
BY MR. DAVIS:
Q. You don't claim anywhere in the Riehm article that that establishes a dose-response relationship, do you?
MS. EMMEL: Objection, asked and answered.
A. We do not need to do that because it's shown here.
BY MR. DAVIS:
Q. You think it's shown by the -- like, the figure that you have --
A. And the analysis, and the risk ratios that are reported there.
Q. But that would be an important finding, if there was a dose-response relationship established by your study,

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correct?
A. Yeah, I think it is an interesting, important finding.
Q. And despite it being an important and an interesting finding, you don't mention anywhere in the Riehm article that that, in fact, is what Riehm shows, right?
MS. EMMEL: Objection, argumentative, asked and answered.
A. We don't use the terms "dose-response relationship," but we talk about this linear relationship.
BY MR. DAVIS:
Q. Okay. And if you look at -- look at your expert report.
A. Here, I'm sorry. Can I interrupt you? Here we say linear trend. That is a dose-response relationship.
Q. A linear trend?
A. Yes.
Q. Well, linear trend may or may not be a dose-response relationship, true?
A. If it's significant, it's a dose-response relationship, I would argue.

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Q. You would argue?
A. Yes.
Q. Okay. But you agree that if there's a trend, that may or may not be a dose-response relationship?
A. Well, if it is as I mentioned, statistically significant, it is statistically significant.
Linear trend means that hours of increasing use of social media is linearly related to the outcome. That is dose-response relationship. We may use the word or not, but it is there.
Q. Your analysis --
A. Yeah.
Q. -- with respect to -- if you look at the figure that you have in your expert report. It's Figure 2.
A. Correct.
Q. It's on page -- it's actually Figure 7 on page 35 of your report. Why don't you get your report out.
A. Okay. 35?
Q. Page 35.
A. Yes.

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Q. Right?
And that -- in that -- in your report, you claim that there's a dose-response shown from that figure, correct?
A. Yes.
Q. And that figure is pulled exactly right out of your Riehm article, correct?
A. Yes.
Q. The Riehm article, however, when it's the figure that you -- underneath the figure in the Riehm article, you don't claim that it shows a dose-response relationship, do you?
MS. EMMEL: Objection, asked and answered.
A. As I mentioned, there's -- we observed a significant linear trend in the coefficients for both internalizing and comorbid problems. And both of them are significant. And we say as time on social media increased, the odds of these outcomes increased proportionately.
So I think if this is not

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dose-response relationship, I don't know what it is.
BY MR. DAVIS:
Q. Do you know of any longitudinal study that has replicated your finding of a claim of a dose-response relationship with social media use and depressive symptoms?
MS. EMMEL: Objection, vague, compound.
A. Yeah, I believe that the Zhang study that actually replicated this with the PATH data. It might be in my materials considered.
I believe they also had -- they looked at different levels, and looked at the association between different levels.
Q. Zhang is not a longitudinal study, is it?
A. It is a longitudinal. It's looking at third wave of the PATH and fourth wave of the PATH.
Q. All right.
A. So maybe --
Q. How do you spell that?
A. Zhang, Z-H-A-N-G.

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Zhang is 2023. I don't see it here.
Q. Is it in your materials considered?
A. It might be in the materials -- this is not materials considered. This is -- no, it is materials considered.
Q. Yeah. That's what we got from your counsel last night.
A. Yeah. So let's see if the Zhang is there.
(Document review.)
A. Yeah, it's not in the list of my -- but it's a '23 study, a 2023 study that replicated this study --
BY MR. DAVIS:
Q. Well, I can't ask you a question about a study I don't know about.
A. If you don't have it, yes.
Q. Right?
Doctor -- and we've confirmed it's not on your materials considered list, correct?
A. Correct.
Q. Okay. Now, let's talk about --

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let's look at Table 2 on page 1270.
A. Table 2, yes.
Q. All right. So your finding for internal problems alone, there was no association between social media use and internalizing problems at 30 minutes or less, correct?
A. Correct.
Q. And if you look at -- then you also looked at greater than 30 minutes up to three hours, correct?
A. Uh-huh.
Q. Yes?
A. Yes.
Q. You also looked at greater than 3 hours up to 6 hours, correct?
A. Correct.
Q. And then you looked at greater than 6 hours, correct?
A. Correct.
Q. And if you look at the confidence intervals, for those three -- for those three categories, the confidence intervals are overlapping, correct?
A. They are overlapping, yes.

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Q. And when you have confidence intervals that are overlapping, that is consistent with a single underlying population value, correct?
A. No, that's incorrect.
Overlapping confidence intervals do not imply that the difference between the two estimates are different. Nonoverlapping means that they're different, but if they might be overlapping and if they're overlapping, there could be a statistically significant difference between the two or not.
Q. Okay.
A. That's a common mistake.
Q. Okay. So overlapping confidence intervals like you see in Table 2 --
A. Yes.
Q. -- those are not consistent with a dose-response effect, are they?
A. I wouldn't say they contradicted a dose-response. Dose-response is not measured by looking at the confidence intervals of individual steps. It is looking

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at the trend of -- the overall trend that you see.
Q. If you look at your article, there's a section that discusses population-attributable fraction, correct?
A. Yes.
Q. I just want to make sure I'm understanding what you're doing there.
A. Yes.
Q. You're not using the population-attributable fraction analysis in the Riehm article to say that there's a dose-response relationship, are you?
A. I'm look -- where are you referring to? Can I...
Okay. Estimates given in Table 3...
(Sotto voce document review.)
A. So it says that -- so it also supports the -- as you said, the dose-response or the linear association.
BY MR. DAVIS:
Q. Yeah. I'm just asking: The population-attributable fraction analysis in the Riehm article, you're not using that to

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say that this shows a dose-response relationship, fair?
A. It supports the dose-response relationship.
Q. So -- but that type of analysis doesn't establish on its own a dose-response relationship, right?
A. But the data that goes into a PAF comes from the model, so if the model shows it, then you can -- it's a different way of looking at the same data. To say that if you remove the effect of over 6 hours of use, what would be the reduction in percentage of adolescents with these problems.
What if you model it, we can say, what if we reduce more than 3 hours, what if you reduce more than 30 minutes, and so it shows, again, that gradation is another way of saying dose-response.
Q. Look --
MR. DAVIS: Move to strike as nonresponsive.
BY MR. DAVIS:
Q. Look at page 1271, last line.

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A. 1271, last line.
Q. In that paragraph, the last paragraph on 1271, you discuss your population-attributable fraction analysis, correct?
A. Uh-huh.
Q. Yes?
A. I'm reading it, yes.
Q. And you say: Of importance, this is not meant to imply that reductions in mental health problems would definitively happen if social media use were reduced or that all social media use is harmful.
Did I read that correctly?
A. That is correct.
Q. And you stand by that statement today, right?
A. That's one piece of evidence.
Q. You agree --
A. It's not definite -- no study is definitive.
Q. You stand by that statement today, correct?
A. That one study is not definitive.

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Q. I'm not asking about the study.
You stand by that statement
today, correct?
A. That's -- that is about this
study. This is not meant -- this is talking
about this study.
Q. Yes.
A. It's meant to imply the
reduction in mental health problems would
definitely happen if social media were
reduced or that all social media use is
harmful.
Q. You stand by that statement as
to this study today, correct?
A. This study, yes, that's a
qualified --
Q. Okay. And, in fact, in order
to make this analysis, to do this type of
population-attributable fraction analysis,
you had to assume that there was a causal
relationship, correct?
A. You have to assume. You have
to -- because you're talking about reduction,
and reduction assumes that this is -- there
is a causal relationship.

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Q. Okay. So the assumption is any
time you're doing that type of analysis, you
have to make an assumption that there's a
causal relationship?
A. Any analysis includes --
involves assumptions.
Q. Okay. So is it fair to say
that you have openly admitted that there's no
causal relationship between social media use
and the findings in the Riehm study?
MS. EMMEL: Objection,
misstates testimony.
A. That is -- can you repeat what
you said?
BY MR. DAVIS:
Q. You have stated publicly that
there's no relationship -- no causal
relationship between social media use and the
findings in the Riehm study?
MS. EMMEL: Objection,
foundation, misstates the document.
A. I have not stated that, no.
I can read it again, if you
want. It doesn't say anywhere what you --
///

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BY MR. DAVIS:
Q. There's no place in the Riehm
study that says that there's a causal
relationship established between depressive
symptoms and social media use, right?
A. Very few studies would say
that. There is -- our study definitively
establishes a causal relationship between
social media use and mental health outcomes.
You wouldn't find it anywhere about cigarette
smoking, about alcohol use and harms --
Q. I'm just asking what your study
says. There's no statement about cause and
effect in Riehm, correct?
A. I haven't read it recently,
so -- but the sentence is there, the
statements we make. We say: Adolescents who
spend more than 3 hours per day using social
media may be at heightened risk of mental
health problems.
Q. May be, right?
A. Yes.
Q. Right? May be?
A. It's not definitive.
Q. Correct.

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And so you say at the
Conclusions -- look at your Conclusions
section.
A. Uh-huh.
Q. You say: This study suggests
that increased time spent on social media may
be a risk factor for internalizing problems
in adolescents.
Correct?
A. Correct.
Q. Not definitive, right?
A. It's not definitive.
Q. Okay. So let's look at --
let's look at what you said publicly.
MS. EMMEL: Counsel, I assume
that we are going to mark this also as
an exhibit and you'll get me the cite
for that?
MR. DAVIS: Yep.
BY MR. DAVIS:
Q. You were interviewed by
JAMA Psychiatry about the Riehm 2019 study
after it was published, correct?
A. I don't think I was
interviewed. I think Kira herself was

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interviewed.
Q. In the interview you said: One thing that we don't know for sure is that there is a causal relationship between exposure to social media and internalizing symptoms.
You said that, didn't you?
A. I don't --
MS. EMMEL: Foundation. We have no basis for this question.
A. Yeah. As I said, I didn't interview with JAMA Psychiatry.
BY MR. DAVIS:
Q. Did you say that or not, Doctor?
MS. EMMEL: Objection, foundation.
A. You have to show me evidence that I said it in an interview.
---
(Whereupon, Exhibit 22 was played in the deposition room, transcribed as follows.)
INTERVIEWER: With these results, how would you want clinicians

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listening to this podcast and reading the paper to think differently or kind of change or kind of implement this as they're working with patients who are certainly using social media?
DR. MOJTABAI: Well, one thing that especially pediatricians should --
(Transcription ends.)
---
MR. DAVIS: Let's stop the audio for a second.
BY MR. DAVIS:
Q. That's your voice that's answering that question, right?
A. Yeah. Yeah. But that's not JAMA Psychiatry.
Q. Okay. What -- what -- who interviewed you?
A. I have no idea.
Q. But you got interviewed about the Riehm study, correct?
A. I might have. I mean, I have gotten a lot of interviews, and this is from 2019 or so. It's possible.

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Q. Let me start your answer again, okay?
A. Okay.
---
(Whereupon, Exhibit 22 was played in the deposition room, transcribed as follows.)
DR. MOJTABAI: Well, one thing, especially pediatricians should consider when dealing with adolescents who present with internalizing problems or depressive symptoms is to consider this as a risk factor and ask about it and investigate the amount and the nature of the social media use in their patient.
Also, this is a conversation that may be brought up to both adolescents and parents of these adolescents who are seen regularly in pediatrician offices or child psychiatry offices.
One thing we don't know for sure is that there's a causal relationship between exposure to

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social media and internalizing symptom, but we also know that the time spent on social media is the time that's spent in social interactions with peers, with family, in physical activity; and those are all important factors in the social-emotional development of young people.
(Transcription ends.)
---
BY MR. DAVIS:
Q. Okay. So one of the things that you said in that interview is that: One thing we don't know for sure is that there is a causal relationship between exposure to social media and internalizing symptoms.
Right?
MS. EMMEL: Objection, foundation.
A. That's what I said in that interview.
But I also said that it is a factor, a risk factor.
BY MR. DAVIS:
Q. And in your article, you say it

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may be a risk factor, right?
A. Well, here -- we're talking about here or the article?
Q. In your article you say: This data suggests it may be a risk factor, right?
A. Do you -- I don't -- I'm looking to see if the "may be" word was here.
Q. Conclusions, quote --
A. May be a risk factor, yeah.
Q. Okay.
A. Yeah.
Q. Thank you.
You got criticisms about the Riehm study, right?
A. Correct.
Q. Dr. Keyes and Dr. Kreski wrote in an article, a letter to the editor, about your study, correct?
A. Correct.
Q. And one of the things they said is that your study's analytic strategy is vulnerable to substantial residual confounding, right?
A. That's what they said.
Q. And they said -- and residual

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confounding, if not properly controlled for, can result in findings of an association that's spurious, right?
MS. EMMEL: Objection, foundation, compound.
A. We talked about confounding. Confounding cannot either produce or imply results or hide, sometimes, results. There's negative confounding too. So it could go either way.
BY MR. DAVIS:
Q. Okay. And Drs. Keyes and Kreski found that there was no association between social media use and -- let me back up.
What those two doctors did, those two researchers, they have published on social media, correct?
A. Correct.
Q. And they are individuals and scientists who have actually done a number of different studies on social media use, right?
A. They have done some.
Q. Yep.
And they actually reanalyzed

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the data from your study, correct?
A. That is correct.
Q. And they found no association between social media use and symptoms of depression or anxiety when social media use was less than 6 hours a day, correct?
A. Their analysis had major limitations.
Q. I'm just asking you what the analysis showed.
It showed that, correct?
A. Their analysis showed, despite these limitations, despite their overadjustment, that the 6 hours or more of social media use is associated with outcomes.
Q. But one thing that they found that was in contrast to what you found is that when they reanalyzed the data to adjust for what they believe needed to be adjusted for in your study that wasn't, they found that there was no association between use of social media and symptoms of depression when social media was used for 6 hours or less, correct?
MS. EMMEL: Objection,

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compound.
A. Right now you said it, and that is -- the thing that you said first is correct. They found an association for 6 hours and more.
BY MR. DAVIS:
Q. But not for 6 hours or less, correct?
A. Because they overadjusted the analysis for a potential mediator.
Q. You thought -- you claim that they overadjusted, correct?
A. Correct.
Q. They thought you underadjusted --
A. Correct.
Q. -- correct?
A. That's correct.
Q. And so they also stated that when examined as continuous scales, social media use of more than 6 hours per day increased internalizing, slash, externalizing symptoms just 0.38 points and explained 0.08% of symptom variance.
Correct?

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MS. EMMEL: Objection, foundation.
A. That is in their reports, but the percent of the variance explained, that's the r-squared that they had reported, it has major limitations brought up by numerous investigators. It's not a good measure of outcome, including Gary King, and Twenge has a paper that refers to this problem also.
BY MR. DAVIS:
Q. Their point in that statement was essentially that less than 1% of the change in symptoms may be attributable to social media, correct?
MS. EMMEL: Objection, foundation.
Do you have something for him to look at?
MR. DAVIS: I'm simply asking if that's the point of what we just talked about.
A. What are you referring to? Can you repeat or show me --
BY MR. DAVIS:
Q. Yeah. Sure.

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A. -- whatever...
Q. I'll hand you what's been marked as Exhibit 20.
(Whereupon, Mojtabai-20, Comment & Response: Is there an Association Between Social Media Use and Mental Health? The Timing of Confounding Measurement Matters, by Keyes and Kreski, was marked for identification.)
(Interruption by the stenographer.)
BY MR. DAVIS:
Q. You see on the right-hand column, first full paragraph, they say: When examined as continuous scales, social media use of more than 6 hours per day increased internalizing, slash, externalizing symptoms just 0.38 points and explained 0.08% of symptom variance.
Do you see that?
A. I see that.
Q. Their point in making that was essentially that less than 1% of the change in symptoms may be attributable to social

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media, correct?
A. You have to look at the standard deviation to make sense of what is -- what does it mean.
Q. Their point was that there was a very slight change in symptoms that could be attributable to social media, correct?
A. I debate that for the reasons I said. They are overadjusting the analysis and they are using the percent of variance explained, which is a faulty measure.
Q. I understand you disagree with them. But their point was that there was a very small change in symptoms that could be attributable to social media, correct?
MS. EMMEL: Objection, asked and answered.
A. As I mentioned, in their faulty analysis in my opinion, I think we said it in response to them. In their faulty analysis, based on an assumption, untestable assumption, they made this calculation.
BY MR. DAVIS:
Q. They made this calculation, and their point is that there's a very small

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percentage of change in symptoms that could be attributable to social media, right?
MS. EMMEL: Objection, asked and answered.
A. Based on their faulty, as I said, calculations, yes.
BY MR. DAVIS:
Q. Okay. And, in other words, their point was social media use is not a substantial factor for the change over time in their view, correct?
A. Their point has been disvalidated or disqualified by that journal article that replicated this study. But you are correct in what you say about their report.
Q. And, in fact, they warned readers of your study that caution should be taken in interpretation of your study results, correct?
MS. EMMEL: Objection.
A. They were --
MS. EMMEL: Foundation.
A. What are you -- oh, caution should be taken in interpretation of this.

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They say that, yes.
BY MR. DAVIS:
Q. Okay. And you and your coauthors had a chance to respond to Drs. Keyes and Kreski in a reply letter, right?
A. Uh-huh.
MS. EMMEL: Objection, foundation.
(Whereupon, Mojtabai-21, Letter to JAMA Psychiatry by Feder et al, was marked for identification.)
BY MR. DAVIS:
Q. Let me hand you what's been marked as Exhibit 21.
Exhibit 21 is your reply letter, correct?
A. Uh-huh.
Q. Yes? Yes?
A. Yes.
Q. And you stated in the left-hand column, second paragraph: Our collective findings have two possible explanations.
We're talking about the Keyes-Kreski explanation and analysis in

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yours, correct?
A. Sorry, where are you referring to? It's not a long -- but which paragraph are you referring to?
Q. I'm looking at the second paragraph on the left-hand side.
A. Okay.
Q. And you say: Therefore, our collective findings have two possible explanations.
A. Right.
Q. 1, frequency -- excuse me, frequently using social media causes contemporaneous psychopathology, which then causes feature psychopathology, i.e., mediation; or 2, psychopathology causes more frequent social media use and also causes future psychopathology, i.e., residual confounding.
Did I read that correctly?
A. Correct.
Q. And you say that -- those were two assumptions that you had to choose from --
A. Uh-huh.

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Q. -- because of the study data, correct? Right?
A. Correct.
Q. Because the study data didn't have information you needed in order to decide which assumption was a more valid one, right?
A. Correct.
Q. And you could not test the second explanation or assumption, right?
A. Or the first one.
Q. Okay. And you even said: The truth is, the Population Assessment of Tobacco and Health study -- which is the study you used, right? Right?
A. Yes.
Q. -- do not allow us to test which assumptions about the relationship between social media use and concurrent psychopathology are correct.
Right?
A. Correct.
Q. And so the Riehm study does not rule out that psychopathology causes more frequent social media use and also causes

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future psychopathology, correct?
A. It's not exactly correct because even if their analysis, even in their faulty overadjusted analysis, they find still association between 6 hours of use and internalizing symptoms.
Q. But the bottom line is the Riehm study does not rule out that psychopathology causes more frequent social media use and also causes future psychopathology, right?
MS. EMMEL: Objection, compound.
A. Can you repeat again? I'm sorry.
BY MR. DAVIS:
Q. Sure.
The Riehm study does not rule out that psychopathology, such as depression or anxiety, causes more frequent social media use and also causes future psychopathology, right?
MS. EMMEL: Objection, compound.
A. So if we assume even if they

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are right, and psychopathology at wave 3 is a confounder, which means it is the cause of both social media use and -- and also psychopathology, so psychopathology at wave 3. So we are -- we haven't overadjusted for that.

But even after doing this, if you still see an association, which they did see, that association, I would suggest -- and their odds ratio, I think, was 1.5. That would suggest that social media is causally related, supports that. I mean, it's not definitive. Nothing is definitive in science. Yeah.

BY MR. DAVIS:

Q. Go ahead. Are you finished?

A. And so I would argue that our study is vindicated, both by their analysis as well as the replication by Zhang.

Q. The Zhang study that I don't know about, correct?

A. Well, we could share with you. I don't know if we --

Q. I didn't prepare for Zhang so let me ask you the next question.

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A. Sure.

Q. When you have a statistically significant result --

A. Right.

Q. -- that's 1.5, is it fair to say that that result can't be ruled out as a result of confounders that were not included in the study?

MS. EMMEL: Objection, speculation.

A. I don't think you can make that judgment based on the size of the association. Air pollution is related to cancers, the odds ratio is 1.1. Smoking is related to cancers, odds ratio is 1.5. Lead exposure is associated with lower IQ. Again, the odds ratio is 1.5.

So based on those, if we're throwing out odds ratios of 1.5 as unreliable, then we're -- we're left with --

BY MR. DAVIS:

Q. Well, if you have a study --

A. Yes.

Q. -- that has a statistically significant finding of odds ratio relative

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risk of less than 2, right, that study is more susceptible to having a confounder that could actually explain the statistically significant result, right?

MS. EMMEL: Objection, speculation.

A. It's very -- it's very context -- it's very -- it depends, as -- you have to tell me the context, the scenario, what is the exposure, what's the -- what's the measure that has been used, what's the prevalence of outcome, what's the prevalence of exposure --

BY MR. DAVIS:

Q. When you concluded your letter to Drs. Keyes and Kreski --

A. Right.

Q. -- you stated that you could not test both hypotheses -- which are the two hypotheses we discussed earlier, right?

A. Correct.

Q. And you were forced to choose one set of assumptions, right?

A. Correct.

Q. And you told them -- you said

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in your reply letter that: Rather because Keyes and Kreski show our observational findings depend on untestable assumptions, this should further motivate experimental studies on social media use and mental health that do not rely on these assumptions.

Correct?

A. It's idea that studies like that are conducted, yes.

Q. Yeah.

And so you had to -- you recognize that there were untested assumptions that were part of your study that you couldn't verify one way or the other, correct?

A. That was -- that was part of -- I mean, we said here experimental studies. At that time, we didn't think about a follow-up study that would use multiple waves of PATH. That also could provide replication. Replication is really the engine of science.

Q. And I'm just asking that you recognized in your letter response that there were untested assumptions that were part of

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your study that you couldn't verify one way or the other, correct?
A. Like any other studies in science, yes, we had untested assumptions -- or untestable, let's put it this way. Not untested.
MR. DAVIS: Right. Okay. Let's take a break.
THE VIDEOGRAPHER: We're off the record at 5:00 p.m. That's the end of Media 8.
(Recess taken, 5:00 p.m. to 5:15 p.m. CDT)
(Whereupon, Mojtabai-22, Riehm Interview Clip, was marked for identification.)
THE VIDEOGRAPHER: We're back on the record at 5:15 p.m. This is the beginning of Media 9.
BY MR. DAVIS:
Q. Dr. Mojtabai, I just have a handful of questions left on the Riehm study, okay?
A. Sure.
Q. If you turn to Table 2.

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A. Let me find it. I'm sorry. Riehm study.
MR. DAVIS: While you're looking for that, Dr. Mojtabai, I'm going to put on the record that we marked as Exhibit 22 a piece of paper that says Riehm Interview Clip, and that will be for the video clip that I showed Dr. Mojtabai.
A. I can't find the Riehm paper. I don't know where it's -- oh, here it is.
BY MR. DAVIS:
Q. You're getting like me, Dr. Mojtabai. We can't find anything.
A. It was on the other side, okay.
Q. All right. Turn to Table 2.
A. Table 2. Yes.
Q. You report out both relative risk ratios and adjusted relative risk ratios, right?
A. Correct.
Q. And your practice is to go with the adjusted relative risk ratios or odds ratios or relative risk ratios, correct?
A. Correct.

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Q. And the reason you go with the adjusted versus the unadjusted in any study is because that takes into account potential confounders, correct?
A. That is correct.
Q. Okay. Now, if you look at Table 1270 -- for the externalizing problems alone, you report adjusted relative risk ratios where the relative risk ratios cross 1.0, correct?
A. Correct.
Q. And when a confidence interval or a correlation coefficient -- let me back up. Let me stick with confidence interval.
When a confidence interval crosses 1.0, that means it's not a statistically significant result, right?
A. For odds ratios and risk ratios, you're correct.
Q. Okay.
A. But for R, that is Pearson's correlation, it's 0 if it crosses to 0.
Q. You anticipated my next question. When you're doing a coefficient correlation -- excuse me -- yeah, a

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correlation coefficient, if it crosses 0.0, if the confidence intervals cross 0.0, it's not statistically significant, right?
A. That is correct.
Q. And, for example, you found in your study that there were no -- for externalizing problems alone, there was no statistically significant association between use of social media and externalizing problems alone, correct?
A. Correct.
Q. And you report that out on page 1271, left-hand column.
A. Left-hand column. Okay.
Q. First full paragraph, you say -- last sentence says: In contrast, we observed no association for externalizing problems.
Correct?
A. That is correct.
Q. And the reason you report out no association is because you didn't find a statistically significant association, correct?
A. That is correct.

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Q. And your practice is that in order to be able to establish an association, it has to be a statistically significant result, right?

A. I have to qualify this. Again, it depends on the context. It is possible, for example, you are including a large number of studies in a meta-analysis, and some of them have -- a lot of them actually might have nonsignificant results. You still put them in the meta-analysis. That's the point of doing a meta-analysis, so you don't throw them out.

And it's possible that in aggregate, those studies, when pooled, they would have a significant association.

Q. Yeah. And I'm not suggesting you throw out for a meta-analysis nonsignificant results.

My only point was that whether it's an individual study or a meta-analysis, for you to find an association, it has to be a statistically significant result, fair?

A. It is a -- one of the indicators of an association.

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Q. Yeah. And it's -- and for you, it's what you typically use.

A. Yes.

Q. Statistical significance is what you typically use to determine whether or not there's an actual association, correct?

A. Typically, yes.

Q. Okay. And in terms of the data on -- the studies on social media use, are you going to point to any nonstatistically significant results and say, oh, this shows there's actual -- an association here?

MS. EMMEL: Objection, speculation.

A. Yeah, as I said, I have to look at it. I mean, it might be the case in a meta-analysis you have a forest plot and you see a number of the studies crossing that 1 line or 0 line, depending on what the outcome measure is, and you still conclude that when you aggregate the results, there's a significant association.

BY MR. DAVIS:

Q. Right.

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A. Each one of those studies have contributed to that result.

Q. Let's set aside meta-analysis for a second.

When you're looking at an individual study to assess whether or not it's -- there's an association or not, for the social media studies, you're not going to come in in this case and say, oh, this individual study showed a nonsignificant association, but it actually -- but I'm interpreting that to mean there's actually a causal association?

A. No, I wouldn't.

MS. EMMEL: Objection, speculation, vague.

BY MR. DAVIS:

Q. I'm sorry?

A. I wouldn't --

Q. Okay.

A. -- interpret that result --

Q. Okay.

A. -- as supporting the causal association.

Q. Okay. And if you had a

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meta-analysis, where you combined a bunch of studies, some that had nonsignificant results and some with significant results, and the meta-analysis found no significant association, you would say there was no association, fair?

MS. EMMEL: Objection, compound.

A. With meta-analysis, you may want to actually conduct further analysis by subgroups of studies. Let's say you were combining longitudinal and cross-sectional and you don't find a significant result based on the combined studies, so you may break it down and say, okay, let's see if the longitudinal studies, for example, show an association and the other ones don't.

So it is context dependent, or case by case, you would treat the results.

BY MR. DAVIS:

Q. Let me see if I got what you're saying.

You're saying that if you got -- you had a meta-analysis result that -- strike that.

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If you had a result from a meta-analysis that was not statistically significant, you would say there's no association, but you would also say we need to do -- we may need to do further testing or analysis to see whether or not that changes?

MS. EMMEL: Objection, compound, vague.

A. Again, I would look at the results. Some of the results might be actually what we call statistical trend, which is larger than .05, typically less than .1, because .05 is a convention we have all agreed. Let's take one in 20 chance for a chance result as indicating there is actually a finding.

So I have seen people do that, look at results saying that there is a trend here and report it also.

BY MR. DAVIS:

Q. Right. But I'm just asking you about what Dr. Mojtabai would do.

If you got a nonstatistically significant result in a meta-analysis, you wouldn't call that an association, would you?

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A. If it's not a trend level. I would call it -- if there is a trend level, I would call it a trend-level association and be candid about it. But if it is not even trend level, I wouldn't call it necessarily that.

Q. So if you got a situation where it was a trend level, but not statistically significant, you would call it a trend level, correct? Is that right?

A. Typically, yes.

Q. You wouldn't say that it was a trend level showing or establishing an association, would you?

A. First of all, I wouldn't use the term "establishing" association, and I may -- if the size of the -- again, it is very case dependent. Let's say you have five cases and the five cases' correlation is very strong, and it's not statistically significant because statistical significance is dependent on the sample size.

Q. Okay.

A. I would say that it is indicative of a possible association,

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although the statistical test is not significant.

Q. Okay. Fair enough. Okay.

In any of the studies that were done on social media use that you analyzed, any of the observation studies -- let me start again, sorry.

Any -- for any of the observational studies that you analyzed for social media use and any adverse mental health outcome, did you analyze in your report -- either of your reports -- whether the association was a result of multiple comparisons?

MS. EMMEL: Objection, vague, foundation.

A. I personally, like many other people in the field, don't believe in adjusting for multiple comparisons, and there are -- Rothman is the major reference on that, very respected Harvard epidemiologist and biostatistician.

So it is not a clear-cut standard that multiple testing should be adjusted.

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BY MR. DAVIS:

Q. But even if multiple comparisons are not done or adjusted for in a study, you still recognize that if there are a number of analyses that are done in a study, that increases the likelihood that you're going to get a spurious association, right?

MS. EMMEL: Objection, vague, speculation.

A. The reverse of it is if you adjust it, you may lose sight of associations that exist.

BY MR. DAVIS:

Q. Yeah, I'm not asking about what if it happens. I'm just saying that you recognize that if there are -- there's a study that does a host of different analyses, that it increases the likelihood that one or more of those results will show an association when there's not one, right?

MS. EMMEL: Objection, vague.

A. Again, I would say that the standards in biostats and epidemiology is -- is -- it's not established. There are

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people, very prominent people, who advocate not adjusting for multiple testing.

So it's not a practice that is universally endorsed, let's put it this way.

BY MR. DAVIS:

Q. Yeah, I'm not trying to get to the merits of it. I'm just trying to get to what can happen if you -- right? Like if you're doing -- there's a study that does multiple comparison -- analyses --

A. Right.

Q. -- right? And there's no adjustment for multiple comparisons, what happens is that that increases the likelihood in a number of people's minds that that result is producing an association where there's not one, correct?

MS. EMMEL: Objection, vague, compound.

A. Again, it's context dependent. Because if you are -- let's say you're looking at different measures of depression and you test them, and all of them show a statistically significant result. Then you adjust for multiple testing and then you find

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that the effect completely disappears, I would say that's a bad practice because those measures are not totally independent.

So it is context dependent. I wouldn't have a blanket statement that multiple testing should be adjusted.

And there are various different ways of adjusting for it. There's Bonferroni that is very conservative and generally kills all the significant results in a study if there are a number of comparisons. There are better ways of doing -- like using a more conservative p value.

BY MR. DAVIS:

Q. Let's look at Section 5.3, which is on page 24.

In the section that's entitled 5.3, Addictive use of social media -- excuse me -- Addictive use of social media is associated with other adverse outcomes, you agree that every one of the studies that you identify in that section is a cross-sectional study, right?

(Sotto voce document review.)

MR. DAVIS: Let me rephrase.

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THE WITNESS: Yes.

BY MR. DAVIS:

Q. For Section 5.3, Addictive use of social media is associated with adverse -- other adverse outcomes, every one of the articles that you identify in this section is either a cross-sectional study or a review article without original data, right?

A. Yeah. One of them, for example, is the Yigiter study, is a meta-analysis. I can't know -- I don't know off the top of my head if they are longitudinal or cross-sectional, so if that's your question.

Q. Okay. Let -- you're referring to the 38 studies of the Turkish population?

A. Yeah.

Q. Okay. You don't know whether those are cross-sectional or longitudinal, do you?

A. I don't know. There were 38 studies that are included, off the top of my head, they were --

Q. I will tell you, I pulled all of those studies.

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A. Uh-huh.

Q. Okay? I couldn't identify a single one that was not cross-sectional.

A. Okay.

Q. Do you have any evidence today to say that there is a study in that group that was, in fact, not cross-sectional?

A. I have no evidence, and if you have done it, good for you. Kudos.

Q. For the other studies that are identified in Section 5.3 of your report --

A. Uh-huh.

Q. -- fair to say that those are either cross-sectional studies or review articles without original data?

A. So Cunningham is a review article. And Duradoni and Rachubinska, I don't -- and Mamun and Griffiths, Brailovskaia, and you're telling me that they're are all cross-sectional?

Q. I'm asking you, can you identify any study in Section 5.3 that is a longitudinal or experimental study?

A. Off the top of my head, no.

Q. You don't know of one today, do

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you?
A. I don't know of any.
Q. Okay. Let's look at Section 5.4.1. This is a section entitled Meta-analyses that support causal link for social media use and depressive symptoms.
Correct?
A. Can you read it again?
Q. Yes.
This section is entitled Meta-analyses support the link between social media use and depressive symptoms.
A. This is correct, as you said. You are correct.
Q. And you chose these studies because you believed that they provided reasonable analysis of the data that they analyzed, right?
A. Correct.
Q. And one of the studies that you identify is the Vahedi and Zannella 2021 study, correct?
A. Vahedi and Zannella, yes, I see that. Vahedi and Zannella, yes.
Q. Let me grab that study.

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(Whereupon, Mojtabai-25, The association between self-reported depressive symptoms and the use of social networking sites (SNS): A Meta-Analysis, by Vahedi et al, was marked for identification.)
BY MR. DAVIS:
Q. I'll mark as Exhibit 25 a copy of that study for you, Dr. Mojtabai.
A. Thank you.
Q. This is an article entitled "The association between self-reported depressive symptoms and the use of social networking sites: A meta-analysis."
Right?
A. That's correct.
Q. Okay. And any findings in the Vahedi-Zannella study that you have -- strike that. That's a terrible question.
Are there any findings in the Vahedi study that you disagree with?
MS. EMMEL: Objection, vague.
A. Off the top of my head, I cannot identify anything that I'm specifically disagreeing with. But as we go

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on, there might be.
BY MR. DAVIS:
Q. Okay. This analysis included both cross-sectional and longitudinal studies, right?
A. Uh-huh.
Q. Yes?
A. Seems like that.
Q. Okay.
A. Yes.
Q. And if you turn to page 2171.
A. 2171. There is no 2171. I don't have --
Q. I'm sorry, look at -- look at the abstract. Look at page 1.
A. Oh, okay.
Q. Right?
It says about seven lines down or six lines down: Limitations of this meta-analysis include the use of mainly cross-sectional studies - limiting the potential for causal claims - as well as the subjective categorization of certain moderator subgroups.
Did I read that correctly?

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A. That's correct.
Q. So you agree that this study mostly contained cross-sectional -- excuse me.
This meta-analysis mainly included cross-sectional studies, right?
A. Yes. I don't see the numbers, though, what number of the studies were cross-sectional, what number is...
I'm just searching through it.
Q. But we know it from the author's statement, it included mainly cross-sectional studies, correct?
A. Okay. Yeah.
Q. Okay.
A. It implies.
Q. And if you look at 2186.
A. 2186. Yes.
Q. There's a section called Limitations, correct?
A. Yes.
Q. And it says one of the limitations, quote: First, most included studies were cross-sectional and it is therefore not possible to determine the

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causal direction of the relationship between social networking site use and depressive symptoms.
Did I read that correctly?
A. That's correct.
Q. You agree with that limitation, correct?
A. That is a fair statement about cross-sectional studies, yes.
Q. Yep.
And it says: As such, the obtained results cannot determine which of the following hypotheses are most likely: 1, that increased social networking site use causes increased depression symptoms; 2, that certain symptoms of depression might cause increased social networking site use, or 3, there is a third factor that explains the relationship between these two constructs.
Did I read that correctly?
A. That's correct.
Q. And you agree that that is a limitation of this study that combined cross-sectional and longitudinal data, correct?

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A. That is -- no, I do not agree. I think that's a general limitation of cross-sectional studies, not this study specifically. They're talking about cross-sectional studies.
Q. No, no. It says -- look here, Dr. Mojtabai. It says: As such, the obtained results -- right?
They're talking about the obtained results of the study, correct?
A. Well, if it is longitudinal, then that issue is less relevant. Wouldn't you think so? I would think so.
Q. I'm not asking what you think.
I'm saying these authors, after analyzing and doing the meta-analysis of cross-sectional and longitudinal studies, say the obtained results, right -- that's what they're saying, the obtained results, correct?
A. Uh-huh.
Q. Yes?
A. Yes.
Q. And the obtained results include both cross-sectional and longitudinal

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studies, right?
A. I assume so.
Q. Yep.
And it says there are three hypotheses that can be taken away from -- strike that.
They say there are three hypotheses, but they can't determine which of the following three that I read out are most likely, correct?
A. That is what they say.
Q. Correct. And you disagree with that, right?
A. I -- I disagree with that.
Q. Right.
They even say: Therefore, given these results, the only claim that can be made confidently is that there is a positive association between self-reported social networking site use and depressive symptoms, and that the causal direction of this relationship is currently unknown.
Did I read that correctly?
A. You read it correctly.
Q. And you agree, that's a

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limitation of this study, correct?
A. Again, I don't agree because there are longitudinal studies included in the analysis as well.
Q. So you disagree with the assessment of the researchers who actually conducted this meta-analysis, correct?
A. I think they are underselling their results because if they're including longitudinal studies -- and I don't know the number of longitudinal studies -- they confer a stronger -- a stronger -- I didn't say conclusive. I didn't say definitive -- a stronger causal claim.
Q. So fair to say that, in your view, a meta-analysis that includes both longitudinal and cross-sectional studies can provide a stronger, but not conclusive, assessment of causality?
A. I would -- I would say so based on the Hill's criteria of consistency. He says if there are studies of the different designs, different investigators, different locations, all support the same conclusion, and that you can see here in the chart -- the

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forest plot that they actually printed, there is considerable consistency across these, almost all of them --

Q. Sir --

A. -- across these, yeah.

Q. Are you done?

A. Yeah.

Q. Sir Bradford Hill never, ever stated anywhere that it was appropriate for a causal assessment to combine cross-sectional and longitudinal data, did he?

A. He stated that if there is consistency across results of these studies, that increases your confidence in causal claims.

Q. But he never said that consistency can be assessed using meta-analyses that combine cross-sectional and longitudinal data, did he?

A. Sir Bradford Hill predated the invention of meta-analysis.

Q. So he could not have possibly spoken to whether or not using cross-sectional and longitudinal data combined in a meta-analysis could support a

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causal inference, correct?

A. It was not possible for him. He died too soon.

Q. Correct.

So he didn't say -- ever say that that was, in fact, that you could use mixed -- a mix of cross-sectional and longitudinal data to support a causal inference, right?

A. Since it didn't exist, the meta didn't exist at the time he was alive, no, he could not have said it.

Q. Have you ever published a cross-sectional -- excuse me.

Have you ever published a meta-analysis that combined cross-sectional and longitudinal data where you say in the publication that this supports a causal inference?

A. I have not.

Q. Let's look at the other studies that you identify in Section 5.4.1, okay?

A. Okay.

Q. Is it fair to say that the only study that did a longitudinal -- excuse me.

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That if you look at that first paragraph of 5.4.1, you identify a number of different studies, correct?

A. Correct.

Q. Let's run through them.

The Cunningham 2021 study, that's a cross-sectional study, right?

A. Again, I know some of these studies included longitudinal studies, like the one that you identified.

Q. Can you -- those meta-analyses that are in Section 5.4.1, can you identify any one that did a meta-analysis, where they did a specific analysis limited to longitudinal studies?

A. I cannot, no.

Q. You discuss the Shin study on page 30. The Shin, S-H-I-N, meta-analysis, right?

A. Where -- what page are you talking?

Q. Page 30.

A. Page 3?

Q. Three-zero.

A. Three-zero. Yes.

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Q. This meta-analysis included an analysis of cross-sectional studies, correct?

A. It's 530 studies. It says cross-sectional, so -- and longitudinal. So it's a mix of studies.

Q. Let's be clear what we're talking about.

The Shin study did an analysis, a meta-analysis, of cross-sectional studies separately, and then it did an analysis of longitudinal studies separately, right?

(Sotto voce document review.)

(Clarification requested by the stenographer.)

A. They reported a correlation of r equal to 0.25 between social media use and depression in cross-sectional studies and a correlation of r equal to 0.12 between baseline social media use and follow-up depression in longitudinal studies.

BY MR. DAVIS:

Q. So do you agree that Shin did a meta-analysis of only cross-sectional studies and it also did a meta-analysis of only longitudinal studies?

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A. He conducted separate analyses for longitudinal and cross-sectional studies.
Q. Let me show you Exhibit 23, which is a copy of the Shin article.
(Whereupon, Mojtabai-23, Online media consumption and depression in young people: A systematic review and Meta-Analysis, by Shin et al, was marked for identification.)
BY MR. DAVIS:
Q. If you look at page 11.
A. Page 11. Yeah.
Q. And under Section 4.4, first sentence, correct? You see that?
A. Yes.
Q. And it says: We observed a small bidirectional correlational relationship between online media use and depressive symptoms in the longitudinal studies.
Did I read that correctly?
A. You read it correctly.
Q. And they also state that: The current result should not be interpreted as a bidirectional causational relationship

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between online media use and depressive symptoms as not all longitudinal studies in the current meta-analysis took into consideration any mediators that may affect the cross-lagged association between media use and depressive symptoms.
A. I'm sorry, can you point me to place where you're reading?
Q. Sure.
If you go eight lines down --
A. Okay.
Q. -- in Section 4.4.
You there?
(Sotto voce document review.)
A. Yes.
BY MR. DAVIS:
Q. It begins with "However."
It says: However, the current result should not be interpreted as a bidirectional causal relationship between online media use and depressive symptoms as not all longitudinal studies in the current meta-analysis took into consideration any mediators that may affect the cross-lagged association between online media use and

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depressive symptoms.
Did I read that correctly?
A. You did.
Q. So these -- these authors who did the study, who crunched the data, who analyzed the results, they are saying that they cannot say there's a causal effect shown by their longitudinal meta-analysis, right?
A. So what they say is: The current results should not be interpreted as a bidirectional causation -- causation.
Q. Right.
A. They don't talk about unidirectional.
Q. Well, bidirectional means that they found results going both ways, correct?
A. Correct. But --
Q. And they're saying that those results can't be interpreted as causal, correct?
A. Well, I didn't see -- first of all, they say: We observed a small bidirectional correlational relationship between online media use and depressive symptoms in the longitudinal studies.

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So they have observed that.
So they're saying because they didn't include mediators, which I don't see the relevance of it in the bidirectional analysis, you don't need to include mediators to establish bidirectional associations.
Q. They're saying that their findings should not be interpreted as causal because of the limitations that they outlined, correct?
A. Because of not having mediation in the model, and that, I don't understand. That is -- that may affect a cross-lagged association.
A cross-lagged association, a cross-lagged analysis, do not need to include mediation to establish bidirectional associations.
Q. So you disagree with these researchers' own analysis of their own data?
A. I don't see the reasoning. I don't understand the reasoning.
Q. You disagree with them?
A. I didn't say I -- I may agree after they explain the results. I can't --

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Q. You can't agree with them here today, right?
A. I can't assume whether they -- what they meant by that.
Q. You can't agree with them here today, right?
MS. EMMEL: Asked and answered.
A. I cannot agree or disagree. I don't have any opinion without knowing --
BY MR. DAVIS:
Q. Okay. Now, you state in your report at page 30 --
A. Yes.
Q. -- that this meta-analysis found a correlation of r equals 0.12 between social media use and depression.
Do you see that?
A. Yes.
Q. Okay. That's wrong, isn't it?
A. Why is it wrong?
Q. You got -- it's wrong based upon the study in Shin, the Shin analysis.
A. You're showing -- can you show me where they report the correlation and it's not there?

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Q. Look at the right-hand column --
A. Okay.
Q. -- on page 8.
A. Okay. Yes.
Q. Look at the second full paragraph.
A. Second full --
Q. Okay. It says: The weighted effect size r on the relationship between depressive symptoms at baseline and online media use at follow-up was .12, indicating a small effect.
Do you see that?
A. Right.
Q. That's the 0.12 that you cite in your report, correct?
A. Right.
Q. And first off, this study didn't analyze depression, but symptoms of depression, correct?
A. That's my sense of it, yes. Usually the studies include measures of depression or questionnaires that measure depression.

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Q. So when you say in your report that this study looked at depression, it's actually looking at symptoms of depression, correct?
A. I'm using their term "and depression." They say online media consumption and depression, but they are talking about depressive symptoms.
Q. Correct.
And so -- and if you look at -- so in terms of the actual exposure that was being assessed --
A. Right.
Q. -- it wasn't entirely accurate in your report, fair?
A. Because it's called depression rather than depressive symptoms?
Q. That's right.
A. Well, I think I have used it interchangeably several places like they have used it. We rely on their statements, and when I say --
Q. But we know --
MS. EMMEL: He's still finishing his answer.

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BY MR. DAVIS:
Q. We know for certain, Dr. Mojtabai --
MS. EMMEL: He still didn't finish his answer.
MR. DAVIS: Are you finished?
THE WITNESS: I'm finished now.
BY MR. DAVIS:
Q. We know for certain that the Shin study did not analyze depression, but rather, symptoms of depression, correct?
A. They tell me they analyzed depression, and so I used their term.
Q. What do they say in the results that you quote? It's symptoms of depression, right?
A. Yeah, so --
Q. Okay. Now, if you look at Table 8 and Table 10, they actually analyze specific -- they actually broke out the -- let me back up.
A. Right.
Q. This study was actually looking at -- at all different types of online digital technology, correct?

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A. Correct.
Q. And so it wasn't specific to social media, correct?
A. Correct.
Q. In Table 8 and Table 10, they actually broke down and did an analysis specific to social media use, correct?
A. Correct. That is correct.
Q. And in those -- in those analyses, they found no association between use of social media and depressive symptoms, correct?
A. No. Wrong.
Q. In Table 8 --
A. Yes.
Q. -- all of the results for social media use are not statistically significant.
A. Each one of them is compared to the baseline. They intercept in the model. They're saying: Are these different than the overall use of social media?
Q. But look at the confidence interval for social media.
A. Doesn't matter. The fact that

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it is not -- that includes 0 suggests to you -- to me that the Internet use is -- overall, has the effect size of 0.13, and social media is not different than overall Internet use.
Q. Let's not lose the point.
When you look at Table 8 and you look at Table 10 specific as to social media, the confidence intervals for the analysis both cross 0.0, correct?
A. That means -- well, you have to be --
Q. Is that true first? Just answer my question.
A. Yes, it is.
Q. Right.
And so if you look at the p values for social media use --
A. Right.
Q. -- none of them reach statistical significance, correct?
A. So --
Q. Is that right?
A. It is correct.
Q. Okay.

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A. But it is interpreted in the wrong way. They are comparing each one of them with the overall social media use, and if they're not significantly different from that overall, it means that they are like overall use.
So -- and it's said in the -- if you read the section about the -- it's really, they're looking whether these different types of social media use are different among themselves and different from overall use, and they don't find any significant differences.
But the overall effect permeates into each one of them.
MR. DAVIS: I'll move to strike as nonresponsive after "It is correct."
BY MR. DAVIS:
Q. All right. You agree that...
(Whereupon, Mojtabai-24, Is social network site usage related to depression? A meta-analysis of Facebook-depression relations, by Yoon et al, was marked for identification.)

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BY MR. DAVIS:
Q. Let me hand you what's been marked as Exhibit 24. I think I went out of order.
A. I have two of them.
Q. Thank you.
This is the Yoon, Y-O-O-N, meta-analysis that you cite in your report, correct?
A. Correct.
Q. Is that right, Dr. Mojtabai?
A. Yes, it's correct.
Q. Turn to page 71. Look at the last paragraph on the right-hand column. Second-to-last -- it's in the second-to-last paragraph -- oh, excuse me.
A. Second-to-last -- I'm sorry.
Q. Yes, second-to-last paragraph on --
A. Yes.
Q. Again, this paragraph is studying -- is discussing the study limitations, correct?
A. Uh-huh, correct.
Q. And it says: Third, we could

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not test causal relations due to the dearth of longitudinal and experimental studies.
Do you see that?
A. Yes.
Q. You agree with that assessment for this study, this meta-analysis, correct?
A. No. I'm not sure how many studies are longitudinal and how many were cross-sectional here in this meta-analysis. I don't recall.
I can't determine from just reading.
(Document review.)
BY MR. DAVIS:
Q. Irrespective of how many cross-sectional or longitudinal studies there were --
A. Yes.
Q. -- these authors said: We could not test causal relations due to the dearth -- meaning absence, right? Yes?
A. Means paucity. It's not --
Q. Absent. Dearth means they're not there, correct?
A. Well, we can check in the

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dictionary. English is not my first language, but you could check. Dearth, I thought, means that very few or --
Q. Very few.
We could not test causal relations due to the dearth or there being very few longitudinal and experimental studies.
That's what they're saying, correct?
A. Okay.
Q. Yes?
A. Yes.
Q. Right? And you agree with that limitation, correct?
(Sotto voce document review.)
A. That is a -- if there are very few longitudinal studies, I would say that is -- I would explain that as that is a limitation.
BY MR. DAVIS:
Q. Okay.
MS. EMMEL: So I think we've been going about seven hours on the record today. So if now is a good

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place to take a break and assess continuing. Is that -- is this a good point?
MR. DAVIS: That's fine.
THE VIDEOGRAPHER: Off the record? All right. We're off the record at 6:02 p.m. That's the end of Media 9.
(Recess taken, 6:02 p.m. to 6:03 p.m. CDT)
(The following proceedings were conducted off the video-recorded record.)
THE STENOGRAPHER: On the record.
MR. DAVIS: All right. We've had a conversation off the record. We are going to reconvene tomorrow at 9:00 a.m. New Orleans time.
And counsel has kindly agreed to bring back the materials that Dr. Mojtabai brought with him to the deposition in case we want to mark the exhibits. Thank you.
THE STENOGRAPHER: Off the

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record.
Time on the record for TikTok is 7 hours today.
(Time noted: 6:04 p.m. CDT)
--o0o--

CERTIFICATE

I, MICHAEL E. MILLER, Fellow of the Academy of Professional Reporters, Registered Diplomate Reporter, Certified Realtime Reporter, Certified Court Reporter and Notary Public, do hereby certify that prior to the commencement of the examination, RAMIN MOJTABAI, MD, PhD, MPH was duly sworn by me to testify to the truth, the whole truth and nothing but the truth.

I DO FURTHER CERTIFY that the foregoing is a verbatim transcript of the testimony as taken stenographically by and before me at the time, place and on the date hereinbefore set forth, to the best of my ability.

I DO FURTHER CERTIFY that pursuant to FRCP Rule 30, signature of the witness was not requested by the witness or other party before the conclusion of the deposition.

I DO FURTHER CERTIFY that I am neither a relative nor employee nor attorney nor counsel of any of the parties to this action, and that I am neither a relative nor employee of such attorney or counsel, and that I am not financially interested in the action.

MICHAEL E. MILLER, FAPR, RDR, CRR
Fellow of the Academy of Professional Reporters
NCRA Registered Diplomate Reporter
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Dated: June 6, 2025



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ACKNOWLEDGMENT OF DEPONENT

I, RAMIN MOJTABAI, MD, PhD, MPH, do hereby certify that I have read the foregoing pages and that the same is a correct transcription of the answers given by me to the questions therein propounded, except for the corrections or changes in form or substance, if any, noted in the attached Errata Sheet.

_____
RAMIN MOJTABAI, MD, PhD, MPH DATE

Subscribed and sworn to before me this
_____ day of _____, 20 _____.
My commission expires: _____

_____
Notary Public

SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF LOS ANGELES

| | |
|---|---|
| COORDINATION PROCEEDING SPECIAL TITLE [RULE 3.400] SOCIAL MEDIA CASES | JUDICIAL COUNCIL COORDINATION PROCEEDING NO. 5255 |
| THIS DOCUMENT RELATES TO: Cristina Arlington Smith, et al., v. TikTok Inc., et al., Case No. 22STCV21355 | For Filing Purposes: 22STCV21355 Judge: Hon. Carolyn B. Kuhl SSC-12 |

Thursday, June 5, 2025
CONFIDENTIAL - PURSUANT TO PROTECTIVE ORDER

Video-Recorded Oral Deposition of RAMIN MOJTABAI, MD, PhD, MPH, VOLUME 2, held at the offices of Irwin Fritchie Urquhart Moore & Daniels LLC, 400 Poydras Street, Suite 2700, New Orleans, Louisiana, commencing at 9:07 a.m. CDT on the above date, before Michael E. Miller, Fellow of the Academy of Professional Reporters, Certified Court Reporter, Registered Diplomate Reporter, and Louisiana Certified Court Reporter #27009.

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P R O C E E D I N G S

June 5, 2025, 9:07 a.m. CDT

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THE VIDEOGRAPHER: We're now on the record. Today's date is June 5th, 2025, and the time is 9:07 a.m. This is the continuation of Dr. Mojtabai.

---

RAMIN MOJTABAI, MD, PhD, MPH, having been previously duly sworn, testified as follows:

---

EXAMINATION

---

BY MR. DAVIS:

Q. Good morning, Dr. Mojtabai.

A. Good morning.

Q. How are you doing today?

A. Good.

Q. Great.

I'm going to pick up where we left off yesterday.

A. All right.

Q. Can you please turn to



Exhibit 24, which is the Yoon study.

I'm sorry, before I ask you that, look at Exhibit 5, page 31 of your report.

A. Yes.

Q. Last paragraph, first sentence.

Do you see in that paragraph you're talking about how there is a high heterogeneity among study results in many meta-analyses?

A. Uh-huh.

Q. You see that?

A. Uh-huh.

Q. You have to answer out loud.

A. I'm looking at it. Page 31, last sentence, you said?

Q. First sentence of the last paragraph.

A. Oh, first sentence. Yes.

Q. Do you see where in that paragraph you discuss the high heterogeneity in many of the meta-analyses that you rely upon?

A. Yes, I do.

MS. EMMEL: Objection,

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misstates the document.
BY MR. DAVIS:
Q. And high heterogeneity -- well, excuse me. Heterogeneity is an epidemiological term that talks about how the studies are dissimilar, right?
A. It's not an epidemiological term.
Q. It's a -- heterogeneity is a term that is used to describe the dissimilarity of the study -- of studies, right?
A. In the context of meta-analysis.
Q. Yes. What they're describing is that the studies themselves have different ways in which they measured outcomes and different ways that they collected exposure?
A. No, not in the context of meta-analysis. In the context of meta-analysis it has a specific meaning. The meaning is that the outcomes are not exactly the same.
MR. DAVIS: Okay. Let's talk about -- oh, a couple of housekeeping

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issues. Sorry, I should have led off with that.
The white notebook that you mentioned yesterday at the beginning of the deposition, that's been marked as Exhibit 26.
(Whereupon, Mojtabai-26, 5/16/25 Mojtabai Expert Report, was marked for identification.)
MR. DAVIS: The black notebook that we mentioned yesterday is marked as Exhibit 27.
(Whereupon, Mojtabai-27, White Notebook of Deposition Exhibits Reviewed by Dr. Mojtabai, was marked for identification.)
MR. DAVIS: The two boxes that you brought to the deposition are marked as Exhibit 28 and Exhibit 29.
(Whereupon, Mojtabai-28, Documents Reviewed by Dr. Mojtabai, A-O Alphabetically, was marked for identification.)
(Whereupon, Mojtabai-29, Documents Reviewed by Dr. Mojtabai,

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P-Z Alphabetically, was marked for identification.)
MR. DAVIS: And then Exhibit 30 is the materials considered -- the amended materials considered list that I got sent to me last night by plaintiffs' counsel. Okay.
(Whereupon, Mojtabai-30, Amended Materials Considered List, was marked for identification.)
BY MR. DAVIS:
Q. If you look at the Yoon study -- it's marked as Exhibit 14.
Have you got that?
A. 24.
Q. 24, right.
And if you look at page 70 --
A. Okay.
Q. -- the last paragraph.
A. The last full paragraph or?
Q. Yes, last full paragraph.
A. Yes.
Q. Excuse me. The last paragraph on the page.
A. Okay.

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Q. You see there's a sentence that says: However, there was significant heterogeneity in the effect sizes, indicating that for some studies, the true relationship between social networking site usage and depression may be negligible.
Did I read that correctly?
A. You read it correctly.
Q. And do you agree that therefore a number of the studies that are included in this meta-analysis, that the true relationship between social media use and depressive symptoms may be negligible?
MS. EMMEL: Objection, compound.
A. I'm looking at Figure 2 that's a forest plot. That's the best way of looking at -- of the lineup of the studies. And I see that the effect sizes for some of them are negligible and for some of them are sizable or large.
BY MR. DAVIS:
Q. You agree that for a majority of the studies included in this meta-analysis that are analyzed in Figure 2,

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that they -- the confidence intervals cross over 0.0, right?
A. That is what you would see in meta-analysis. That's why you --
Q. I'm just asking if that's what you see. I'm just asking what you see in Figure 2?
MS. EMMEL: Let him finish his answer. Let him finish his answer.
A. I was saying that in -- that's why we're doing meta-analysis. If each one of them crossed that -- was not crossing the line, we wouldn't do meta-analysis.
BY MR. DAVIS:
Q. Let's come back to my question.
For the studies that are reflected in Figure 2 of this meta-analyses, that the majority of them cross -- have confidence intervals that cross 0, right?
A. Well, that's not the first thing I look at in a meta-analysis.
Q. Dr. Mojtabai, I'm not asking you if that's the first thing. I'm asking you if, in fact, the majority of the studies reflected in Figure 2 cross 0.0 for

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confidence intervals.
A. I have to count to see if it is the majority or not. But again, this is not something that I look at.
Q. I'm just asking --
A. I'm looking at the forest plot.
Q. Can we agree that there's a significant number?
Strike that.
Can we agree that there's a number of studies --
A. Sure.
Q. -- in Figure 2 that -- where the confidence interval crosses 0, right?
A. I haven't counted them, but for a number of them it doesn't, as you said.
Q. Yeah.
A. It crosses the line, yes.
Q. Which reflects that there's no association, right?
A. Again, this is a misrepresenting of meta-analysis. Meta-analysis is not looking at individual studies. It's looking at the aggregate results.

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So you have to look at the diamond-shaped figure at the bottom that is not crossing the line.
Q. My point is simply --
MR. DAVIS: Move to strike as nonresponsive.
BY MR. DAVIS:
Q. I simply asked you whether or not, when the confidence intervals crosses 0 in Figure 2 of this meta-analysis for individual studies, that means there's no association, correct?
MS. EMMEL: Objection, asked and answered.
A. Again, I say that this is a meta-analysis. We don't look at a meta-analysis like that.
BY MR. DAVIS:
Q. I'm not asking you about the meta-analysis. I'm asking you about the individual studies.
The individual studies in Figure 2, that are reflected in Figure 2, a number of them have confidence intervals that cross 0, right?

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A. So if you --
MS. EMMEL: Asked and answered.
A. If you break the meta-analysis and you go back to individual studies and look at them, you may be right, yes.
BY MR. DAVIS:
Q. And so there are some studies that -- in Figure 2, when you're just looking at the individual study results, right, not the meta-analysis world, but the individual study results, you have some that show an association and some that do not, correct?
A. Some that show a significant association and some don't. I have to correct you -- what you said.
Q. Okay. And so there is not -- and because of that, these individual studies, looking at them individually, don't show consistency, do they?
MS. EMMEL: Objection, vague.
A. As the authors of the paper say, there is heterogeneity, and that's not something that would make me think that these results are showing different things, because all the lines, all the dots line up on the

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right-hand side, almost all of them -- not all of them literally. Maybe two of them don't line up on the left side.

But the majority, large majority line up on the right side of the 0 line.

And if I look at the median, that's the middle value, it's around 0.1, 0.11. That's the value for the median value of the --

MR. DAVIS: I move to strike as nonresponsive.

BY MR. DAVIS:

Q. Dr. Mojtabai, did you have an opportunity last night to speak with counsel about the substance of your testimony?

A. Last night?

Q. Either last night or this morning?

A. The substance of my testimony?

Q. Yes.

A. No. We were talking about the process of the questions, what type of questions were going to be asked. She's going to apparently ask me some questions. I

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learned that.

Q. All right. But in terms of anything about the substance of your testimony, did you discuss that with counsel after your deposition ended last night?

A. No, we didn't.

Q. Okay. You mentioned yesterday the -- we discussed the Kelly study that was from the UK Millennium study, right?

A. Yeah.

(Whereupon, Mojtabai-31, Social Media Use and Adolescent Mental Health: Findings From the UK Millennium Cohort Study, by Kelly et al, was marked for identification.)

BY MR. DAVIS:

Q. Let me show you Exhibit 31.

A. Uh-huh.

Q. If you look in the abstract...

A. Yes. Yes.

Q. Oh, I'm sorry. I'm sorry.

Go to the Discussion section. It's on page 66. Left-hand column --

A. 66?

Q. Here, let me show you. I'll

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hand you exactly what I want you to see.

I put an arrow there for you.

Do you see that?

A. Yes.

Q. It says: However -- the study authors say: However, caution is needed when interpreting our finding as the data used in this paper were, for the most part, cross-sectional, and the direction of association, and therefore, causality, cannot be inferred.

Did I read that correctly?

A. You did.

Q. So there's no question that the Kelly study actually had cross-sectional data in it, correct?

A. That is correct.

Q. Okay. Let's put that aside.

You also mentioned yesterday the Zhang, Z-H-A-N-G study --

A. Yes.

Q. -- that you said replicated the findings from your dose-response analysis -- what you say is a dose-response analysis in Riehm, right?

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A. I don't --

MS. EMMEL: Objection, mischaracterizes testimony.

A. Yeah, I didn't think I -- I don't recall talking about dose-response with regard to this paper. I said it replicates our study.

BY MR. DAVIS:

Q. Okay. Let's get clarity on that, then.

A. Okay.

Q. You're not testifying in this case that -- strike that.

You're -- you don't view Zhang as replicating what you say is a dose-response effect in the Riehm study, do you?

A. I don't recall them looking at dose-response.

Q. Well, let me look at -- here's Exhibit 32, which is a copy of the Zhang study.

(Whereupon, Mojtabai-32, Longitudinal relationship between social media and e-cigarette use among

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adolescents: The roles of internalizing problems and academic performance, by Zhang et al, was marked for identification.)

A. Yeah. Yes.

BY MR. DAVIS:

Q. Do you need time to look at that paper?

A. I can look at it?

Q. Yeah.

MR. DAVIS: Let's go off the record.

THE VIDEOGRAPHER: We're off the record at 9:19 a.m. That's the end of Media 1.

(Recess taken, 9:19 a.m. to 9:22 a.m. CDT)

THE VIDEOGRAPHER: We're back on the record at 9:22 a.m. This is the beginning of Media 2.

BY MR. DAVIS:

Q. Dr. Mojtabai, have you had a chance to look at the Zhang paper?

A. Yes, I did.

Q. And do you agree that it did

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not do a dose-response analysis?

A. Not in those words. But what they do is to put a measure that has different levels of social media use in the model, and they look at its linear effect on the internalizing symptoms.

Q. What are you referring to?

A. I'm talking about the measure that they're using, measure of social media use. Frequency of social media use. I'm looking at --

Q. What page?

A. -- page 4 of 10. The independent variable social media use in wave 3 measures the frequency of social media use. The response was a 7 point Likert scale that included never, less often, every few weeks, one to two days a week, three to five days a week, and above once a day.

And then they put that in the model and looked at its association with internalizing symptoms at wave 3 adjusting -- at wave 4, adjusting for wave 3 mental health problems that replicates our study, and they found significant results that replicates the

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results of our study, saying, first of all, that the association of social media use with future mental health outcomes persists even after adjusting for contemporaneous associations at wave 3.

And also that there is a linear relationship between social media use and mental health outcomes.

Q. Okay. Dr. Mojtabai, the Zhang study doesn't break out and report on -- let me back up.

You said that they broke out different time periods for social media use, correct?

A. Correct.

Q. But they don't break out in the study any results for any of those time periods, do they?

A. They put it in a linear regression and they --

Q. No, no. They don't report out on any of the results for any of those individual time periods, do they?

A. They do not break it down, but --

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Q. Right. For example --

MS. EMMEL: Wait, let him answer the question.

MR. DAVIS: Go ahead, Dr. Mojtabai.

A. What they do is they put this ordinal measure in the linear regression and they find a significant regression coefficient, which supports a linear relationship.

If there wasn't a linear relationship there, you wouldn't see a significant coefficient in the regression model.

BY MR. DAVIS:

Q. But they don't show you the results of any individual period of time to see -- do they?

A. Again, dose-response relationship does not require that you show each of them.

What we did, for example, in our study was to do a linear test. We never mentioned even the term "dose-response relationship" in our study.

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Q. This paper doesn't say anywhere in it that there's a dose-response relationship between use of social media and any symptoms, does it?
MS. EMMEL: Asked and answered.
A. Our study also doesn't say that, so it's -- it's implied. And then you have a linear relationship. When you have a test of trend, of linear trend, that is, in spirit, a dose-response relationship. It's a linear relationship.
BY MR. DAVIS:
Q. So in your view, the dose-response relationship is reflected in spirit, but not words, in the Zhang study?
A. In content and spirit, it is --
Q. But not stated, correct?
A. In those words, it is not.
Q. Well, there's no words that -- in the Zhang study that say that the -- explicitly say that the researchers found a dose-response relationship between use of social media and any symptoms, correct?
MS. EMMEL: Objection, asked and answered.

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A. Yeah. As I answered before, there is nowhere, either in this study or our study, that we used the term "dose-response."
BY MR. DAVIS:
Q. Okay. Thank you.
If you turn to page 32 of your report, Section 5.4.3.
A. Page 32.
Q. Are you there?
A. 5.4.3, yes.
Q. And very first sentence it says: While a majority of studies of the association of social media use -- and it goes on, right?
A. Uh-huh.
Q. So you agree that there's a -- the majority of the studies showing an association between social media use and depression are cross-sectional studies, correct?
A. That is correct.
MS. EMMEL: Objection, misstates the document.
BY MR. DAVIS:
Q. Now, you talk about in this

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section there are three well-constructed longitudinal studies about an association between problematic social media use and depressive symptoms, correct?
A. Correct.
Q. The three longitudinal studies are Mundy, 2021; Boers, B-O-E-R-S, 2019; and your Riehm study, correct?
A. That's correct. But in addition, there have been newer studies that have come on board since I published, since --
Q. You don't discuss those studies in either your April report or your May report, do you?
A. They have been published after that time.
Q. But you don't discuss them. You haven't submitted a supplement discussing your opinions of them, have you?
MS. EMMEL: Asked and answered.
A. I haven't.
BY MR. DAVIS:
Q. Okay. If you -- you discuss that these studies attempted to adjust for

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preexisting mental health problems, correct?
A. That's correct.
Q. You said that they try to eliminate the effect of these problems on social media use and thus examine the causal effect of excessive social media use on depressive symptoms at a future time point, i.e., ruling out reverse causation. Correct?
A. Can you point me where you are reading from?
Q. It's on page 32.
A. 32.
Q. It's the third paragraph under 5.4.3.
A. Okay. 3.
Q. Did I read that correctly?
A. By adjusting for preexisting mental health problems, these studies try to eliminate the effect of these problems on social media use and thus examine the causal effect of excessive social media use on depressive symptoms at a future time point. That means ruling out reverse causation. Yes.

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Q. Okay. And because that's -- reverse causation is something that needs to be factored into and considered for purposes of establishing that, in fact, social media use is resulting in causal effects for mental health outcomes, right?

MS. EMMEL: Objection, vague, compound.

A. Can you repeat the question?

BY MR. DAVIS:

Q. Sure.

Reverse causation has to be considered for purposes of determining whether or not there's a causal effect between use of social media and any mental health outcome?

MS. EMMEL: Same objections.

A. It has to be considered. It is one of the factors that has to be considered when you're looking at --

BY MR. DAVIS:

Q. Okay.

A. -- data.

Q. For example --

MS. EMMEL: You're cutting him

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off again. Let him finish.

MR. DAVIS: You have a very low voice, Dr. Mojtabai.

THE WITNESS: Sorry about that.

A. Yeah, you have to consider that for, as you were saying, interpreting data or studies, study designs.

BY MR. DAVIS:

Q. For example, a teen might be depressed or down, then isolate and spend more time on social media because they are depressed or have depressive symptoms, right?

A. It is possible, yes.

Q. Yes. That's something you have to consider?

A. Yes.

Q. And a teen might be anxious or stressed about a family situation, school or friends, and spend more time on social media because of that, right?

A. For different reasons, they might be anxious or depressed and spend more time on social media.

Q. Okay. We've already talked about Riehm.

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A. Uh-huh.

Q. Let's talk about Mundy. Mundy focuses on subclinical levels -- let me hand it to you.

(Whereupon, Mojtabai-33, Social networking and symptoms of depression and anxiety in early adolescence, by Mundy et al, was marked for identification.)

BY MR. DAVIS:

Q. Exhibit 33 is Mundy. If you go to page 32.

A. It doesn't have page 32.

Q. Sorry, 549. Okay.

Right-hand column, last paragraph, and about -- about ten lines down, there's a sentence that begins "Our study focuses."

A. Yes.

Q. It says: Our study focuses on subclinical levels of symptoms and not clinically significant levels of depression and anxiety.

Do you see that?

A. Yes.

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Q. Right.

And so this -- that's exactly what the Mundy study was looking at, right?

A. I have to look at the measure they have used and the weighting on that measure.

Q. Can we agree that -- Dr. Mojtabai, can we agree that that's what the study authors said about their study?

A. That's what they said in this.

Q. Okay. Let's go to the -- in other words, they -- these -- this study wasn't assessing diagnosed disorders or what the researchers considered as clinically significant, correct?

MS. EMMEL: Objection, speculation.

A. On these scales, higher scores, severe levels of symptomatology are strongly correlated with clinically significant --

BY MR. DAVIS:

Q. Dr. Mojtabai, these researchers --

MS. EMMEL: Excuse me. You interrupted him again.

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MR. DAVIS: I didn't.
MS. EMMEL: You did. He was not finished.
MR. DAVIS: Are you finished, Dr. Mojtabai?
A. No, I wanted to say that measures of these types of scales in a sample, the mean -- changing mean is also strongly correlated with extreme values, which are measures of clinically significant outcomes.
MR. DAVIS: Okay. Move to strike as nonresponsive.
BY MR. DAVIS:
Q. Doctor, these researchers said that they were not looking at clinically significant symptoms, such as diagnosed disorders, correct?
A. That is what they say --
Q. Okay.
A. -- in this paper.
Q. Now -- and, in fact, if you look at 550, left-hand column.
A. Yes.
Q. In the first paragraph, they

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say: Although we found associations between social network usage and mental health symptoms, the effect size of these associations were small to moderate, especially when adjusting for prior symptoms, and smaller than well-established risk factors such as prior symptoms.
Do you see that?
A. I see this sentence, yes.
Q. You don't disagree with that, do you?
A. I disagree with that.
Q. All right. Let's talk about the Boers study.
(Whereupon, Mojtabai-34, Association of Screen Time and Depression in Adolescence, by Boers et al, was marked for identification.)
BY MR. DAVIS:
Q. Exhibit 34 is the Boers study.
A. Uh-huh.
Q. If you look at the Measure section that's on page 855.
A. 855, yes.
Q. If you look at -- on the

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right-hand side of 855, second full paragraph -- excuse me, third full paragraph -- or third paragraph, it says: Each multilevel model controlled for baseline socioeconomic status and sex.
Correct?
A. That is correct.
Q. Those are the two confounders that they -- that they assessed for, correct?
A. It appears so, yes.
Q. Okay. They didn't assess for prior psychiatric symptoms or disorders, adverse childhood experiences or known confounders for depression and anxiety, did they?
MS. EMMEL: Objection, compound.
A. If you give me a moment to look at it.
(Document review.)
BY MR. DAVIS:
Q. Dr. Mojtabai, do you have any question in mind?
A. I'm looking at it because it appears to me it's a multi-wave study.

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MR. DAVIS: Okay. Let's go off the record so you can look at it.
THE VIDEOGRAPHER: We're off the record at 9:38 a.m. This is the end of Media 2.
(Recess taken, 9:38 a.m. to 9:41 a.m. CDT)
THE VIDEOGRAPHER: We're back on the record at 9:41 a.m. This is the beginning of Media 3.
BY MR. DAVIS:
Q. Dr. Mojtabai, the Boers study didn't assess for prior psychiatric symptoms or disorders, adverse childhood experiences or other known confounders for depression and anxiety, did it?
MS. EMMEL: Objection, compound.
A. This is a multi -- according to what they say, a multi-wave study, and they are using a within-person association based on repeated measures, which implies to me that they adjusted for mental health problems in the prior wave for the next wave.
///

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BY MR. DAVIS:
Q. At baseline, the Boers study did not assess for prior psychiatric symptoms or disorders, adverse childhood experiences or other known risk factors for depression or anxiety, did it?
MS. EMMEL: Objection, speculation.
A. I do not -- yeah, I do not know that.
BY MR. DAVIS:
Q. You don't see it in the paper that they did such an adjustment, do you?
A. They -- they describe their design as a design that would imply adjusting for prior waves in future waves, so that's my assumption of the --
Q. It's an assumption, but the paper doesn't say it, does it?
A. It's an assumption based on what they describe as their design.
Q. It's an assumption, but the paper doesn't say it, true?
A. The paper doesn't say it in so many words --

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Q. Okay.
A. -- but it has the design that would allow to do that.
MR. DAVIS: Move to strike after "The paper doesn't say it." All right.
BY MR. DAVIS:
Q. Dr. Mojtabai, let me hand you what's been marked as Exhibit 35.
(Whereupon, Mojtabai-35, National Trends in the Prevalence and Treatment of Depression in Adolescents and Young Adults, by Mojtabai et al, was marked for identification.)
BY MR. DAVIS:
Q. This is an article that you wrote entitled National Trends in the Prevalence and Treatment of Depression in Adolescents and Young Adults, right?
A. Correct.
Q. Turn to page 2, top left-hand corner. Do you see you state in this article: The risk of depression sharply rises as children transition to adolescence.
Do you agree with that?

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A. I agree, yes.
Q. Yeah. And that's a statement that you agree with, right?
A. Correct.
Q. And there's a natural baseline, if you will, of -- for adolescents where, as they get older, their risk for depression, or anxiety for that matter, increases with time, right?
MS. EMMEL: Objection, compound.
A. Yeah, I'm not sure what you mean by "natural baseline," the term that you used.
BY MR. DAVIS:
Q. Let me rephrase it.
As an adolescent gets older, their risk for depression or anxiety increases, correct?
A. That is correct.
Q. Okay. And changing family dynamics or personality traits can all have a -- play some role in that, right?
A. That is correct.
Q. Problems at school, problems

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with friends, all of those can play a role in that, right?
A. Yeah, they could play a role in depression.
Q. And if you look at -- back to the Boers study.
A. Yes.
Q. This study, if you look in the Results section -- excuse me. It says -- under the Main Outcomes and Measures on the very first page, it says: Symptoms of depression was the outcome.
Correct?
A. Where? I'm sorry, where --
Q. First page.
A. Okay.
Q. In the abstract, Main Outcomes and Measures, it says: Symptoms of depression was the outcome.
Do you see that?
A. Symptoms of depression, first -- can you point?
Q. I underlined it in red.
A. Okay. Yep.
Q. Do you agree with that?

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A. Yep.
Q. Okay.
A. Based on what they say.
Q. Again, it wasn't assessing diagnosed disorders, correct?
A. It was using a scale, a validated scale to assess --
Q. Symptoms.
A. Symptoms that are of a mental disorder.
Q. I'm sorry, you have to keep your voice up.
A. Symptoms of depressive disorder, yes.
Q. Okay. If you look at page 34 of your report.
A. 34?
Q. Yep.
A. Yep.
Q. And you look at the -- your top sentence it says: While the Boers and colleagues' study did not specifically examine different social media platforms -- Right?
A. Uh-huh.

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Q. Right, you see that?
A. Yes.
Q. So this study was not analyzing specifically different social media platforms, correct?
A. It did not.
Q. Okay. If you look at -- let's look at the next...
A. Are we done with 35?
Q. Yes.
(Whereupon, Mojtabai-36, Which social media platforms matter and for whom? Examining moderators of links between adolescents' social media use and depressive symptoms, by Gentzler et al, was marked for identification.)
BY MR. DAVIS:
Q. I'm going to hand you what's been marked as Exhibit 36. This is the Gentzler study that you cite in your report, right?
A. Uh-huh.
Q. Yes?
A. Yes.
Q. And if you go down to

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page 1743.
A. Yes.
Q. Go to the first paragraph, fourth sentence -- well, the fifth sentence. It says: Second -- this is the section discussing the limitations of the study, correct?
A. Limitations and -- yes --
Q. And it says: The correlational design limits causal conclusions. Correct?
A. Let me find -- which line are you on?
Q. 1743, six lines down.
(Sotto voce document review.)
THE WITNESS: Again, can you please mark it?
A. Yes.
BY MR. DAVIS:
Q. Do you see that that's -- so that's reflective of why that this is a cross-sectional study, correct?
A. Correct.
Q. This study doesn't know which way the association is going in terms of

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whether social media use is increasing symptoms or the symptoms are increasing social media use, right?
A. If you give me a moment, again, to refresh my memory.
(Document review.)
A. Yes, I'm ready.
BY MR. DAVIS:
Q. Okay.
A. What's the question? Can you repeat the question?
Q. Sure.
This study was unable to establish which way the association was going, whether it was social media use leads to increased symptoms or increased depressive or anxiety or other symptoms lead to social media use, right?
MS. EMMEL: Objection, compound.
A. It was a cross-sectional study and has the limitations of cross-sectional studies.
BY MR. DAVIS:
Q. Which means it can't answer

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that question that I asked you, right?
A. It cannot establish the causal relationship, the direction of causation.
Q. Thank you.
(Whereupon, Mojtabai-37, Bored and online: Reasons for using social media, problematic social networking site use, and behavioral outcomes across the transition from adolescence to emerging adulthood, by Stockdale et al, was marked for identification.)
BY MR. DAVIS:
Q. I've handed you what's marked as Exhibit 37, which is the Stockdale and Coyne study you cite in your report.
If you look at the abstract, the very first sentence it says: The current study examined motivations for social networking site use across three years during the transition from late adolescence to emerging adulthood.
Do you see that?
A. Yes.
Q. And if you look at -- so that's what it's actually looking at. It's looking

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at motivations for using social media, correct?
A. That's what it says.
Q. Right. And it -- if you turn to page 182, 7.3 has Limitations and Conclusion, correct?
A. Correct.
Q. And the third sentence --
A. Yes.
Q. -- it says --
I'm sorry, third-to-last sentence of the paragraph.
A. Third-to-last sentence.
Q. It says: Finally, the current study did not adjust for baseline levels of outcome variables.
Do you see that?
A. Yes.
Q. As a result, direction of effects is difficult to determine.
Do you see that?
A. I see that.
Q. Right.
They're saying that they're not sure which direction the association is going

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for the -- any of the outcomes and findings that they have, correct?
MS. EMMEL: Objection, compound, vague.
A. What they say is it is difficult to determine.
BY MR. DAVIS:
Q. Correct.
And so they're saying that they don't know whether or not the actual association that's seen is valid or not, correct?
A. I think --
MS. EMMEL: Objection, vague.
A. Yeah, it's vague. It's not exactly what they say.
BY MR. DAVIS:
Q. But we do know that they did not adjust for baseline levels of the outcome variables, correct?
A. That, we know.
Q. Yeah.
A. They say that.
Q. Right.
And so they're not adjusting

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for potential confounders, correct?
MS. EMMEL: Objection, speculation.
A. That is -- yeah, that is -- whether -- they're looking at motivation. Whether prior mental health conditions could impact motivation is -- motivation for use of different apps, I don't think it's established in the literature.
So saying that it is a confounding variable is -- requires more.
BY MR. DAVIS:
Q. But they say that they didn't adjust at baseline for potential confounders, correct?
MS. EMMEL: Objection, misstates the document.
A. They don't say anything about -- they say they did not adjust for prior mental health conditions. That's what they say, I think.
BY MR. DAVIS:
Q. All right. Well, the study did not -- if you look at the methods...
Well, let's go to -- let's go

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back to your report for a second.
A. Okay.
Q. Page 32, paragraph -- third paragraph.
A. You mean bullet point or under?
Q. If you look at Section 5.4.3 --
A. Yes.
Q. -- second full paragraph.
A. Yes.
Q. You identify several studies that didn't find an association between use of social media and depressive symptoms, correct?
A. Yes. I say -- yes.
Q. For example, Stockdale and Coyne didn't find one, correct?
A. That's what I say here, yes.
Q. The Coyne 2020 didn't find an association, correct?
A. I'm looking -- reading it again to see what I say here.
(Sotto voce document review.)
A. Coyne 2020, Erevik 2021, Beeres 2021, Puukko 2020, I say found no significant effect.

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BY MR. DAVIS:
Q. Yes, and it's Beeres, B-E-E-R-E-S?
A. Correct.
Q. Okay. And so you recognize that there are studies that found no association between use of social media and depressive symptoms, correct?
A. There are correlational studies or cross-sectional studies that found no associations, that's correct. There are longitudinal studies that found no association, and there are experimental studies that found no association.
But the majority of these studies -- of each one of these categories found an association.
Q. Dr. Mojtabai, is it your testimony that your methodology is simply counting up the number of studies that found an association versus those that did not, and that's how you arrive at a causal conclusion?
A. No, I'm responding to your question whether these studies found an association or not. I'm saying there are

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studies that did not found a -- find an association, and there are studies that found an association.
My methodology is look at all of them, at the totality of evidence. I don't pick studies and count and tally them, whether they support it or did not support.
Q. Right. There's more to it -- there's more to a causal assessment than just counting up the number of studies that found an association versus those that did not, correct?
A. I think that's the -- what the counsel has been doing so far, counting studies that have limitations that do not support a causal association.
MR. DAVIS: I move to strike as nonresponsive.
BY MR. DAVIS:
Q. I'm asking you that a causal assessment is not done simply by counting up the number of studies that have an association versus those that don't have an association, correct?
A. That's -- that is correct.

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Q. Yeah.
And what you have to do is instead, you have to look at the quality and rigor of each individual study to make an assessment about whether or not that study is appropriate to include in a causal analysis, correct?
A. You have to look at that as well as the totality of the research. So individual -- there are individual studies that are very small, and they do not find a finding. There are studies that have a limitation in one aspect; they have strengths in other aspects.
That's why we do a meta-analysis. We combine the studies that have limitations, are done by different people, and we look at the consistency of the evidence across longitudinal and individual correlational studies and as well as experimental studies. We put them all together. It's a -- it's like a jigsaw puzzle; you fill it in.
Q. Yeah. In your reports, you didn't take the studies that you found to be

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higher quality or more rigorous and do an analysis specific to them, did you?
MS. EMMEL: Objection, vague.
A. I think I have picked some studies, some example studies that are larger. I thought that they were more appropriate, more clearly address the issue, and mentioned them and talked about them at more detail.
But most of my study is based on meta-analysis and aggregate data.
BY MR. DAVIS:
Q. Right. I think you were talking about that yesterday, that you focused a lot on the meta-analyses that were done and placed emphasis on those, those meta-analyses, in reaching your opinions.
MS. EMMEL: Objection, misstates testimony.
A. That is one element, not all. I have looked at --
BY MR. DAVIS:
Q. Sure.
A. -- experimental studies. I have -- actually, I think I have about over

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30 longitudinal studies mentioned in this report, nine experimental studies, six meta-analyses of experimental studies, and numerous meta-analyses of mixed correlation and longitudinal studies as well as a lot of individual studies that larger -- larger-scale and answer -- address the question.
Q. Okay. You haven't, though, done an analysis where you've taken the more robust studies that find an association and compare those to the more robust studies that find no association, have you?
MS. EMMEL: Objection --
BY MR. DAVIS:
Q. You haven't done that analysis in your report?
MS. EMMEL: Objection, vague.
A. There's a lot of -- first of all, I don't know what robust means, and that there is an element of subjectivity if we do that; we just pick some studies that we think are more robust and compare them to other studies that are not as robust, as you suggest.

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I don't think anybody does that in scientific literature or anywhere that I have seen.
BY MR. DAVIS:
Q. You didn't take, for example, all the studies that looked -- that satisfy temporality, that adjusted appropriately for confounders, and do an analysis of those studies to determine whether or not there's an association between use of social media and any adverse mental health outcome, did you?
MS. EMMEL: Objection, compound.
A. There is a -- as I mentioned there is some subjectivity in quality assessments, what you say appropriately adjusted for this or that confounder.
BY MR. DAVIS:
Q. But you didn't do the analysis that I just asked you about, did you?
A. To look at those -- can you repeat the question?
Q. Yeah.
You didn't take the studies

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that satisfied temporality and also appropriately adjusted for confounders and do an analysis specific to those studies, did you?
A. I don't know what appropriately adjusted means. Any adjustment is incomplete because we don't have all the data that we need.
So I did not do an analysis, as you say, that includes or involves such a level of subjectivity.
Q. Okay. But you didn't even do an analysis where you just separated out the studies that actually satisfy temporality, did you?
A. In effect, you're asking me did I limit my studies to longitudinal studies.
Q. Yes.
A. I did not limit my analysis to longitudinal studies. I looked at the totality of evidence. There are cross-sectional studies that are better than -- some are better than others. Some have more limitations than others.
There are experimental studies

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that some of them are better, some of them have more limitations. And there are longitudinal studies that have different levels of limitation and strengths.

So I didn't limit myself to a type of study.

Q. You didn't -- for example, if there was an experimental study that was affected by attrition rates or demand effects or lack of randomization, you didn't carve those out of your causation analysis, did you?

MS. EMMEL: Objection, incomplete hypothesis.

A. If there were studies that had so many limitations, as you said, that had all of those limitations that you said, first of all, they wouldn't get published. They wouldn't pass the peer-review standards.

And I don't think that I specifically used a quality -- subjective quality index like you're saying of attrition -- an arbitrary attrition rate. What is the attrition rate that is accepted in this field? There is no standard that we

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could use.

You have to use some subjective measure, and that would make my analysis subjective.

BY MR. DAVIS:

Q. Now, Dr. Mojtabai, let me circle back to something about the Riehm study, okay?

A. Okay.

Q. The Riehm study only looked at symptoms of depression or what you call internalizing symptoms, right?

A. That is correct.

Q. Okay. And you're not claiming that --

A. I have to make a correction. It also looks at externalizing symptoms.

Q. Yes, sir. Yeah, it did.

But you're not claiming that the Riehm study establishes a dose-response effect for anything other than symptoms of depression, are you?

A. The outcome measure there is symptoms of depression.

Q. So it doesn't apply to other

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psychiatric disorders or symptoms, other than symptoms of depression?

MS. EMMEL: Objection, vague.

A. To the extent that that outcome measure extends to other mental health problems, like anxiety, there is -- there are questions about anxiety in the -- in the internalizing symptom scale.

BY MR. DAVIS:

Q. But you're not claiming, for example, that the Riehm study shows a dose-response effect for anxiety or anxiety symptoms, are you?

MS. EMMEL: Objection, compound.

A. I think internalizing symptoms people would understand, it's a cross between depression and anxiety symptoms.

BY MR. DAVIS:

Q. All right. You're not claiming that the Riehm study shows a dose-response effect for any eating disorder, are you?

A. That study -- that wasn't one of the outcomes of that study.

Q. So you're not making that claim

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in the case, right?

MS. EMMEL: Objection, misstates testimony.

A. Not based on the Riehm study, correct.

BY MR. DAVIS:

Q. You're not claiming that the Riehm study shows a dose-response effect for suicidal thoughts or behavior, are you?

A. I don't think that any of the items on the Riehm question -- on the questionnaire used in the Riehm study actually measures suicidal ideations.

Q. So you're not saying that there's a dose-response effect in Riehm for suicidal thoughts and behavior, fair?

A. In that study, I -- no, we didn't think that.

Q. You're not claiming that there's a dose-response effect seen in the Riehm study for body dysmorphia or body dysmorphic disorder, are you?

A. To the extent that depressive symptoms are related to other mental health outcomes, that question comes up. But it's

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not answered in this study; it is suggested.
Q. Okay. Look at the -- I'm going to hand you what's been marked -- I'm going to hand you -- go back to your report.
A. Yes.
Q. You talked about the Braghieri 2022 study on page 35 of your report.
A. Yes.
Q. If you go down to the very last page -- the very last sentence on the page it says: This -- you're talking about the Braghieri 2022 study, correct?
A. Correct.
Q. You say: This type of analysis is generally known as ecological as it is not based on individual participants, but rather, based on exposures and outcomes, both measured at aggregate level.
Correct?
A. That is correct.
Q. And Braghieri did not follow the same individuals over time, correct?
A. That is correct. It did not measure individuals.
Q. Right.

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And you agree that that is true for other ecological studies as well, correct?
A. By nature, ecological studies look at aggregate or groups of people, not individual people.
Q. Ecological studies are not assessing increase in risk at the individual level, right?
MS. EMMEL: Objection, vague.
A. There are methods to extrapolate from ecological studies -- as Gary King at Harvard has spoke on that, to extrapolate from ecological studies to individual participants and the effect on individuals.
BY MR. DAVIS:
Q. You haven't done that analysis for any ecological study for social media use, have you?
A. I have not.
Q. You're not aware of anyone who has done such an analysis for an ecological study in social media use, right?
A. I am not aware of any.

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Q. Okay. And the Braghieri, if you look at -- let me hand you what's been marked as Exhibit 38.
(Whereupon, Mojtabai-38, Social Media and Mental Health, by Braghieri et al, was marked for identification.)
BY MR. DAVIS:
Q. If you go to page 29.
A. There's no page 29 here. What page do you want me...
Q. If you go under Discussion --
A. Yes.
Q. -- the very last sentence says: For instance, our estimates cannot shed light on whether the increased reliance on Facebook for news consumption has exacerbated or mitigated the effects of Facebook on mental health.
Did I read that correctly?
A. Yes.
Q. And you agree with that limitation, right?
A. This study looks at the use of Facebook. It doesn't look at the content of what is seen on Facebook.

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Q. That's not my question.
They set out a limitation here in their article that says: Our estimates cannot shed light on whether the increased reliance on Facebook for news consumption has exacerbated or mitigated the effects of Facebook on mental health.
Correct?
A. That is what they said.
Q. You agree with that limitation for this study, correct?
A. I do agree, yes.
MR. DAVIS: You doing okay?
THE WITNESS: No, I'm good. After I finish this bottle, I may need a break.
(Recess requested by the stenographer.)
MR. DAVIS: Let's do that now. Let's go off the record.
THE VIDEOGRAPHER: We're off the record at 10:12 a.m. That's the end of Media 3.
(Recess taken, 10:12 a.m. to 10:27 a.m. CDT)

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THE VIDEOGRAPHER: We're back on the record at 10:27 a.m. This is beginning of Media 4.
BY MR. DAVIS:
Q. Dr. Mojtabai, let's turn to Section 5.5 of your report that deals with suicidal behavior.
A. Yes.
Q. Dr. Mojtabai, is it your -- are you -- strike that.
Is it your opinion to a reasonable degree of medical and scientific certainty that use of social media causes or substantially contributes to suicidal thoughts or behavior?
A. Not use by itself, so that statement, I don't agree with that.
Q. So use of social media by itself does not cause or contribute to suicidal thoughts or behavior?
A. Use of social media by itself doesn't.
Q. Okay. So when you say by itself it doesn't, what's the...
A. Excessive or problematic use of

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social media --
Q. Okay.
A. -- is a risk factor for suicidal ideation.
Q. What's -- how much time does a person have to spend on social media in order to have suicidal thoughts or behavior that are caused or substantially contributed to by the use of social media?
MS. EMMEL: Objection, compound, vague.
A. Putting a number on it is not really, I don't think, appropriate. It's also the way they engage in the social media, is a factor.
BY MR. DAVIS:
Q. Okay.
A. But the number -- excessive use is a use that exceeds what the person intends to do or wishes to do and is associated with forgoing other activities, is impairing in functioning, is -- has distress associated with it, is associated with loss of control.
Q. For any use of social media and any adverse mental health outcome that you

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claim is caused by social media, what's the amount of hours or what's the amount of time per day, per week or per month, or however you want to describe it, that would qualify as excessive media use that would result in social media causing the adverse mental health outcomes identified in your reports?
MS. EMMEL: Objection, compound, vague, asked and answered.
A. Yeah, I don't think you can put an actual number on it because I said the way people engage with it, how they use it, how they interact with the medium and its consequences for their life, that would constitute excessive.
De Angelis reports that, on average, nowadays, adolescents use social media for five hours a day, so we can't set a time for what is excessive, first of all, because it changes over time.
And also, it's not the amount by itself. It's the way people engage with social media and the consequences of excessive use, excessive hours of use that is associated with harm.

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BY MR. DAVIS:
Q. So you haven't set a time period of any kind when you say -- when you're defining excessive social media use, have you?
MS. EMMEL: Objection, argumentative.
A. I haven't set a time, but there are other reports by Twenge and others who have suggested times cutoffs.
BY MR. DAVIS:
Q. Have you reached an opinion to a reasonable degree of medical or scientific certainty where you can say this amount of time equals excessive social media use that will then result in one or more of the adverse mental health outcomes you've identified in your expert reports?
MS. EMMEL: Objection, asked and answered.
A. As I said, an hour, number of hours measure I don't think reflects the harms we're talking about --
BY MR. DAVIS:
Q. So you haven't set a time?

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A. As I said, I haven't. I haven't.
Q. Okay. Let's look at -- you discuss three studies in this section, Huang 2022, Nesi 2021, Tørmoen 2023, right?
A. Correct.
Q. You also discuss the Chu 2023 study, correct?
A. Chu...
I also talk about the Macry- --
Q. Yeah, I'm going to get to all those.
Here, let me hand you Tørmoen, right? I've opened up to the Limitation section of that study. That study is now marked as Exhibit 39.
(Whereupon, Mojtabai-39, A nationwide study on time spent on social media and self-harm among adolescents, by Tørmoen et al, was marked for identification.)
MS. EMMEL: Can I get one also?
BY MR. DAVIS:
Q. Do you see that that's a cross-sectional study?

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(Document review.)
BY MR. DAVIS:
Q. Dr. Mojtabai?
A. Yes.
Q. And, in fact, the authors say: Of course, in a cross-sectional study, conclusions about mediation or causality cannot be drawn.
Correct?
A. As in most cross-sectional studies, yeah, they caution the readers about drawing causal inference.
Q. Let's look at the Nesi study, which is going to be marked as Exhibit 40.
(Whereupon, Mojtabai-40, Social media use and self-injurious thoughts and behaviors: A systematic review and meta-analysis, by Nesi et al, was marked for identification.)
BY MR. DAVIS:
Q. This is a study that assessed -- it's actually a meta-analysis that looked at social media use and self-injurious thoughts and behaviors, correct?

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A. That is correct.
Q. Okay. This meta-analysis mainly includes cross-sectional data, correct?
MS. EMMEL: Objection, vague.
A. I don't know what percent of the studies included are cross-sectional and what percent are longitudinal.
I'm now looking at Table 1 that identifies studies as cross-sectional or longitudinal, and that is correct. The majority of studies are cross-sectional.
BY MR. DAVIS:
Q. Right.
This study did not do a separate analysis of just longitudinal studies, correct?
A. I have to look at it to see if they separated the longitudinal from nonlongitudinal and did analysis of them.
(Document review.)
MR. DAVIS: Let's go off the record while you review.
THE WITNESS: Yeah, sure.
THE VIDEOGRAPHER: All right.

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We're off the record at 10:34 a.m.
That's the end of Media 4.
(Recess taken, 10:34 a.m. to 10:35 a.m. CDT)
THE VIDEOGRAPHER: We're back on the record at 10:35 a.m. This is the beginning of Media 5.
BY MR. DAVIS:
Q. Dr. Mojtabai, this study did not do a separate analysis of only longitudinal studies, correct?
A. I do not see them doing that.
Q. Right.
And if you look at the abstract on page 1, five lines up from the bottom of the abstract it says: There was no association between frequency of social media use and self-injurious thoughts and behaviors.
Correct?
A. That is what they say.
Q. So this study found no such association, correct?
A. They say specifically, no association between frequency of social --

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MS. EMMEL: Misstates the document.
A. They say no association between frequency of social media use.
BY MR. DAVIS:
Q. Okay. And if you look at page 13, the very -- down at the back.
A. I have to --
Q. Here you go.
A. -- complete my statement that they say results largely suggested medium effect sizes for association between specific social media constructs and SITB.
Q. Correct.
But they're reporting that in terms of the frequency of use of social media, they don't find an association, correct?
A. That's what they state.
Q. Let's look at the Chu study.
That's going to be marked as Exhibit 41.
(Whereupon, Mojtabai-41, Screen time and suicidal behaviors among US children 9-11 years old: A prospective cohort study, by Chu et al, was marked

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for identification.)
BY MR. DAVIS:
Q. The Chu 2023 study was a cohort study, correct?
A. Again, if you give me a minute, I can look at that.
Yes, it is ABCD cohort study.
Q. Okay. Go to page 3 of the study.
A. Yes.
Q. Do you see that?
A. Yes.
Q. Last full paragraph, six lines up from the bottom of the paragraph, there's a sentence that starts "It is important."
Do you see that?
A. Yes.
Q. It says: It is important to highlight that in fully adjusted models, social media was not associated with suicidal behaviors at two-year follow-up.
Did I read that correctly?
A. You read it correctly.
Q. So over time, the more time that was looked at in the study, there was no

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association between use of social media and suicidal behavior, correct?
A. That's one of the findings of this study.
Q. So this study, are you claiming that this study shows a statistically significant association between social media use and suicidal thoughts or behavior?
A. What I'm seeing is, in Table 2, association between baseline screen time and suicidal behaviors at two-year follow-up. And the odds ratios are significant for total screen time. And for social networking at -- in unadjusted analysis, there is significant.
And there's a trend level association with the odds ratio of 1.27 in the adjusted analysis, and the p level is 0.076.
Q. Okay. So this -- this study on the fully adjusted analysis found no statistically significant association between use of social media and suicidal behaviors, correct?
MS. EMMEL: Objection, misstates testimony.

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A. When you say statistical association, it -- you have a limit at mind, a p level.
BY MR. DAVIS:
Q. I didn't ask you that, Dr. Mojtabai.
This study, under the fully adjusted analysis, found no statistically significant association between use of social media and suicidal behavior, true?
MS. EMMEL: Objection, asked and answered.
A. Can you specify statistical -- can you clarify? What do you mean by statistical significant?
BY MR. DAVIS:
Q. Dr. Mojtabai, we've been talking about statistical significance for two days.
A. Yeah. I want to understand what you mean here.
Q. Dr. Mojtabai, the results that are shown in Table 2 for use of social media and suicidal behavior do not show statistically significant association, fair?

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MS. EMMEL: Objection, asked and answered.
A. You have to complete your sentence. Statistically significant association at, dot, dot, dot. And that is not there. Can you please tell me?
BY MR. DAVIS:
Q. There was no statistically significant association between use of social media and suicidal behaviors at the two-year follow-up, true?
A. I think statistically significant has to be specified, what is meant by. If you mean .05, no. If you mean a trend level association, I would say there is a trend level significant association. Trend level.
Q. A trend level but not a statistically significant association that rejects the null hypothesis, correct?
MS. EMMEL: Objection, vague, asked and answered.
A. Yeah, I think I did answer that.
If you set the --

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BY MR. DAVIS:
Q. Listen to my question.
A. Yes.
Q. It shows a statistically -- it shows no statistically significant association; in other words, this finding does not reject the null hypothesis, correct?
A. If their null hypothesis was -- they said that -- beforehand, they say that, we want to reject this null hypothesis of no statistically significant association at .05 p level, then you are correct.
But if they didn't say that, I can't assume that that was their hypothesis.
Q. You're not claiming that the Chu 2023 study shows a statistically significant association between use of social media and suicidal behavior, are you?
MS. EMMEL: Objection, asked and answered.
A. This is what I would say.
The study showed statistically significant findings at -- in unadjusted analysis, and a trend level association, trend level association, at -- in the

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adjusted analysis.
MR. DAVIS: Move to strike, nonresponsive.
BY MR. DAVIS:
Q. Doctor --
MR. DAVIS: I'm just giving you fair warning, I'm bringing him back if this continues. This is just not appropriate for him to be able to be on record about what his opinions are, what the meaning of statistical significance, and then not answer my questions that are directly on point to his own testimony.
I'll ask it again.
MS. EMMEL: Again --
MR. DAVIS: I'll ask it again.
MS. EMMEL: I'm going to respond to your statement. He has answered your question. He said that -- he said when there was statistically significant findings, he qualified when it was. And so he did respond to your question.
MR. DAVIS: It's just games

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playing.
BY MR. DAVIS:
Q. Dr. Mojtabai, the fully adjusted analysis in Chu did not find a statistically significant association between use of social media and suicidal behavior, true?
MS. EMMEL: Objection, asked and answered, harassing.
A. I think I did answer. If you set the significance level -- you could set the significance level at an arbitrary level, and you say, at this level, did it reject the null hypothesis or not, then you can say that.
So I think the statement that is made -- the question that's asked me is incomplete.
BY MR. DAVIS:
Q. Dr. Mojtabai, can you identify a single longitudinal study that identified a statistically significant association between use of social media and suicidal thoughts or behavior?
MS. EMMEL: Objection, vague.

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A. Yeah, I think there's -- there are lots of elements in it. Use of social media, you again said.

One of the studies looked at the content of social media and showed a significant association.

So I don't remember which one it was, one of the studies that you asked me to look at.

BY MR. DAVIS:

Q. Okay.

A. And I would again go back to saying this study, the ABCD study, shows a trend level association between -- in an adjusted analysis between social media use and suicidal ideation, and in unadjusted analysis shows statistically significant at .05 level.

Q. But no association at the .05 level, right?

A. And no association at .05 statistical significance level.

Q. Correct.

A. That's what I've stated.

Q. And identify for me any

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longitudinal study that showed a statistically significant association at the .05 level between use of social media and suicidal thoughts or behavior.

MS. EMMEL: Objection, vague and ambiguous, compound.

A. And I think I responded. One of the studies we talked about --

BY MR. DAVIS:

Q. There's just one.

A. Yeah.

Q. You don't know of another?

A. The ones that I found for this report is the one.

Q. What are they?

A. Well, this one that you talked about, and -- you want me to look at it again? I can do that.

MR. DAVIS: Let's go off the record.

THE WITNESS: Yeah.

THE VIDEOGRAPHER: All right, we're off the record at 10:46 a.m. That's the end of Media 5.

(Recess taken, 10:46 a.m. to

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10:47 a.m. CDT)

THE VIDEOGRAPHER: We're back on the record at 10:47 a.m. This is the beginning of Media 6.

A. So looking at the Nesi meta-analysis, if you go to Table 2, there are a number of associations, statistically significant association at p level of .001.

BY MR. DAVIS:

Q. I think you've missed my question.

My question was: Identify any longitudinal study that shows a statistically significant association at the .05 level between use of social media and suicidal thoughts or behavior.

MS. EMMEL: Objection, asked and answered.

A. Use has to be defined. Use of social media by itself, as I've --

BY MR. DAVIS:

Q. Any use of social media, Dr. Mojtabai. Any use.

A. There are studies that look at depressive symptoms that are associated and

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major risk factor for suicidal ideations and behaviors, and some of the measures also include suicidal ideations.

But I cannot, off the top of my head, remember a study that sets this -- what you say, longitudinal study and looks at the --

Q. There's not one, is there?

A. I do not know.

Q. You don't know of an experimental study that shows a statistically significant association between use of social media and suicidal thoughts or behavior, do you?

A. I can't think of one at this time.

Q. All right. Let's -- your report in Section 5.6, including the subsections, deal with negative comparisons, body image disturbance, eating disorder symptoms and body dysmorphic disorder or body dysmorphia, right?

A. Correct.

MS. EMMEL: Objection, compound.

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BY MR. DAVIS:
Q. I'm sorry, Dr. Mojtabai, what did you say?
THE WITNESS: She had an objection.
MS. EMMEL: Go ahead and answer.
A. Yes.
BY MR. DAVIS:
Q. Okay. Now, when you say body disturbance, do you mean body dissatisfaction?
A. Body image dissatisfaction, yeah.
Q. And you understand that having body dissatisfaction in the adult and pediatric population, regardless of social media use, is common?
MS. EMMEL: Objection, vague.
A. Yeah, what do you mean by common? What's the prevalence?
BY MR. DAVIS:
Q. Well, you know of -- are you aware that studies show that body dissatisfaction in adult or pediatric

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patients is as high as 80%?
MS. EMMEL: Objection, foundation.
A. I'm not -- I'm not aware of 80%.
BY MR. DAVIS:
Q. Have you investigated the issue of how prevalent or common body dissatisfaction is in adult or pediatric patients to form your opinions in this case?
A. From what I reviewed for this report, I haven't encountered a prevalence of 80%.
Q. Did you -- that's not my question.
My question was: Did you assess and analyze, for purposes of your opinions in this case, the prevalence of body dissatisfaction in adult or pediatric patients?
A. As I mentioned, it is -- first of all, there are different ways of defining and measuring it, and that impacts the prevalence. And based on the studies that I have looked at for this report, I did not see

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any prevalence estimate of 80%.
Q. We're not communicating. I haven't asked you that.
I just simply asked you: Have you gone and looked at the literature to see what the prevalence rate is for adult or pediatric patients when it comes to body dissatisfaction?
A. In the context of this report?
Q. In the context of social media, right?
A. In the context of social media.
Q. But you haven't gone out and looked at it to see what the background rate for body dissatisfaction in adult or pediatric patients in the general population, have you?
MS. EMMEL: Objection, asked and answered.
A. Not separate from what is in the report.
BY MR. DAVIS:
Q. And you agree that neither body dissatisfaction nor disordered eating is alone enough to diagnose somebody with an

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eating disorder or BDD, right?
MS. EMMEL: Objection, compound, vague.
A. These are symptoms of, as you said, eating disorders or of body dysmorphic disorder.
BY MR. DAVIS:
Q. But they're not enough for a diagnosis, correct?
MS. EMMEL: Same objections.
A. Yeah, we need a lot more to make a diagnosis.
BY MR. DAVIS:
Q. All right. Now, any --
MS. EMMEL: I think he wasn't finished.
A. Yeah. We have to get a measure of symptoms, disability, impairment, impact of the behavior in the person's life. So for diagnosis, we would need a lot more.
But these scales are suggested and they're used in clinical settings to -- to identify and screen for -- for body dysmorphic disorder or eating disorder.
///

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BY MR. DAVIS:
Q. The scales that are used to assess body dissatisfaction, disordered eating or symptoms of eating disorders were all screening tools and not diagnostic measures, correct?
MS. EMMEL: Objection, speculation.
A. Yeah, they are validated by -- by clinical scales or clinicians' diagnosis.
BY MR. DAVIS:
Q. You haven't answered my question, Dr. Mojtabai.
The screening scales that were used in the body imaging studies, the eating disorder symptom studies, and the disordered eating studies are all screening tools; they're not diagnostic tools, correct?
MS. EMMEL: Objection, speculation, vague.
A. As you said and I said, there are screening measures to identify people who are at risk of disordered eating.
BY MR. DAVIS:
Q. They identify who may be at

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risk, but they don't determine who actually has either an eating disorder or body dysmorphia or BDD, right?
MS. EMMEL: Objection, compound.
A. They identify who might be -- who is a probable case.
BY MR. DAVIS:
Q. Not someone who actually has either of those disorders, correct?
MS. EMMEL: Objection, argumentative.
A. If somebody scores high on these scales, it's highly probable that they would be suffering from eating disorder or body dysmorphia --
BY MR. DAVIS:
Q. Dr. Mojtabai, you're missing my question. The screening tools --
MS. EMMEL: He was still not finished with his answer.
BY MR. DAVIS:
Q. The screening tools that are used for body dysmorphia, body imaging studies, eating disorder symptoms, disordered

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eating, they are not diagnostic of whether or not someone actually has an eating disorder or BDD, right?
A. They are used for identifying people who are highly likely to have those disorders.
Q. Well, they may be highly likely, but it's not confirmed whether or not they actually have them, correct?
MS. EMMEL: Objection, argumentative, asked and answered.
A. They are not, by themselves, diagnostic.
BY MR. DAVIS:
Q. Okay. And you also know that there -- have you done any analysis for any of the screening tools to determine the predictive value of those screening tools to determine whether or not someone has an eating disorder or BDD?
A. I haven't done that, but I'm sure there is literature on this.
Q. Okay. Can you identify any study on social media use of any kind that's a longitudinal or an experimental study that

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actually looked at diagnosed eating disorders or BDD?
A. That's not the standard of epidemiological studies. We don't use clinicians to identify cases. We use scales, questionnaires, as you mentioned, screening measures. And they are highly correlated with the other clinical outcomes that you are talking about or may be interested in.
MR. DAVIS: Move to strike, nonresponsive.
BY MR. DAVIS:
Q. Dr. Mojtabai, can you identify any study on social media use of any kind that's actually looked at diagnosed eating disorders or BDD?
MS. EMMEL: Objection, asked and answered.
A. As I said, this is not the standard --
BY MR. DAVIS:
Q. I'm not asking for the standard. I'm asking, can you identify one?
A. Even if I had identified one, I would be suspicious about the results because

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they haven't used a standardized measure to -- that is validated to measure an outcome. It's based on a clinician's -- some clinicians making a diagnosis.

MR. DAVIS: Move to strike, nonresponsive.

BY MR. DAVIS:

Q. Dr. Mojtabai, identify one such study.

MS. EMMEL: Objection, asked and answered.

A. As I said, it's not a standard of -- of research in this field.

BY MR. DAVIS:

Q. I'm not asking if it's a standard. I'm asking you to identify a single study that looked at either eating disorders that were diagnosed or BDD that was diagnosed as an outcome measure in any of the studies on social media use.

MS. EMMEL: Asked and answered multiple times.

A. If it's not a standard, it's not done and I wouldn't be identifying them --

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BY MR. DAVIS:

Q. So you don't know of one, right?

MS. EMMEL: Wait. You cut him off. Please let him finish.

Finish with your answer, Dr. Mojtabai.

A. Yeah, as I was saying, if it is not done, if it is not the standard, even if I identify one, I would not pay attention to it because the validity of the outcome is not clear in my mind.

BY MR. DAVIS:

Q. Okay. So for you, you haven't identified one because you don't think that's a valid endpoint?

A. I don't think by itself it's a valid endpoint to put in the study and not use any structured interview or semistructured interview or a scale or a questionnaire to measure the outcome.

Q. None of the studies that you discuss in your expert reports analyze outcomes -- strike that.

None of the studies that you identify or discuss in your reports have used diagnosed eating disorder or BDD as an outcome measure, fair?

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MS. EMMEL: Objection, asked and answered, harassing.

A. The standard of research in the field and what I would consider a respectable research is to use an outcome measure that is standardized, that has established reliability and validity.

Clinician diagnosis are not commonly used in this type of research --

BY MR. DAVIS:

Q. Dr. Mojtabai, I've not asked you that question. I've not asked you that question, and I've been very kind and polite to you, and I'm asking you again. Please identify -- strike that.

None of the studies that you identify in your expert reports used BDD or an eating disorder as an outcome measure, right?

MS. EMMEL: Objection, harassing, asked and answered.

Last time on this question.

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A. My report is based on data that I consider replicable and reliable, so studies that would use a measure that is not replicable, standardized, validated with established reliability and validity data, I would not even consider to --

BY MR. DAVIS:

Q. But I'm not asking you that. I'm not asking you whether you would consider or not.

I'm just asking you that whether any of your studies in your report actually identify a diagnosed eating disorder or BDD as an outcome measure. That's all.

A. I think in my response, it's included. The response to your question is --

Q. You don't identify one, do you?

A. Because it's not the standard in this field.

Q. Okay. You keep saying that it's not the standard in this field.

You don't practice in the area of eating disorders or BDD, do you?

A. I practice in psychiatric

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epidemiology, and I have published a lot in psychiatric epidemiology. I review articles, I review grants.

Q. You --

MS. EMMEL: Wait, let him finish.

A. This is my field. I know psychiatric epidemiology. I have been practicing it for more than 20 years. I know what's the standard.

BY MR. DAVIS:

Q. You have never published any article on what the standard of research is on eating disorders or BDD, have you?

A. I haven't done a study or set of guidelines for the standard. I'm telling you what the practice is, what the standard in this field of research is.

Q. And you've never discussed that standard -- you've never discussed with any researchers whether or not it's appropriate to have BDD or eating disorders as a valid outcome measure, have you?

MS. EMMEL: Objection, vague, asked and answered.

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A. My practice of conducting research in psychiatric epidemiology in my practice, I have used standardized measures. I have used validated and reliable measures, questionnaires, scales, and that outcome, a clinician --

BY MR. DAVIS:

Q. You've never --

A. -- assessment by itself is not a measure that I would consider in my research.

So it's not my practice. It's not practice of most epidemiologists, psychiatric epidemiologists who do this type of research.

Q. You've never had --

MS. EMMEL: Wait.

BY MR. DAVIS:

Q. You've never had a discussion with any researchers that focus on eating disorders or BDD about what's the appropriate outcome measure for an observational or experimental study, have you?

MS. EMMEL: Asked and answered, harassing.

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A. I don't recall.

BY MR. DAVIS:

Q. Yeah. You've never published any research where you identify what the appropriate standard is for an outcome measure in eating disorders research or BDD research, have you?

MS. EMMEL: Objection, compound.

A. I haven't published anything on the -- what's the appropriate standard.

BY MR. DAVIS:

Q. And your focus -- your focus of epidemiological research --

A. Yeah.

Q. -- over time, all the articles and publications and lectures you've given, you've never published a single thing on eating disorders or body dysmorphic disorder or what should or should not be used as a valid outcome measure in such research, have you?

A. I have published on eating disorders.

Q. As what's a valid outcome

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measure?

A. No, that's not a -- I have published empirical research. I haven't published standards for other researchers.

Q. Can you identify a single patient in any of the studies that looked at eating disorder symptoms, body dysmorphia, BDD, disordered eating or body imaging disturbances or body dissatisfaction, where one of those patients, just one, went on to develop either an eating disorder or body dysmorphic disorder?

MS. EMMEL: Objection, vague, compound, calls for speculation.

A. Can you repeat that question?

BY MR. DAVIS:

Q. Sure.

Can you identify a single patient in any of the studies that you looked at for eating disorder symptoms, body dysmorphia, BDD, disordered eating, body dissatisfaction, where one of those patients went on to develop either an eating disorder or body dysmorphic disorder?

MS. EMMEL: Same objections.

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A. You start with have you identified a single patient. Well, these studies do not identify individual patients. These are epidemiological studies or --
BY MR. DAVIS:
Q. I think you're missing the point.
MS. EMMEL: Wait, you didn't let him finish. No, he wasn't finished.
MR. DAVIS: Yeah, he's told me --
MS. EMMEL: He wasn't finished.
MR. DAVIS: He's taken issue with the question. I'm rephrasing the question.
MS. EMMEL: He was answering.
MR. DAVIS: I'll withdraw the question.
MS. EMMEL: Okay.
BY MR. DAVIS:
Q. Doctor, for any of the study participants in any of the studies that looked at eating disorder symptoms, body dysmorphia, BDD, disordered eating, body

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dissatisfaction, can you identify one study participant, just one, that actually developed an eating disorder or body dysmorphic disorder as a result of social media use?
MS. EMMEL: Vague, compound, calls for speculation.
A. As I mentioned, these studies are not looking at the outcome, clinical outcome in those terms, that they ended up going to a hospital or being seen by a provider.
They use scales and questionnaires that measure symptoms of eating disorder, and they are -- those measures are standard -- standardized, replicable, high reliability and validity. They are associated with clinical outcomes.
If you have those measures, you do not need or it's not even possible for most studies to go and follow people to see whether they end up going to a clinic or hospital or are they hospitalized later on, and follow them individually later on.
MR. DAVIS: Move to strike as

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nonresponsive as -- after "As I mentioned, these studies are not looking at the outcome -- clinical outcome in those terms."
BY MR. DAVIS:
Q. Dr. Mojtabai, can you identify any study participant -- study participant of a study involving eating disorder symptoms, BDD, body dysmorphia or body dissatisfaction or disordered eating where the -- there was an actual assessment in the study that the -- that the study participant actually had a diagnosed eating disorder or BDD?
MS. EMMEL: Objection, asked and answered.
A. Yeah, as I mentioned, this is not the standard of research to go within the study and then see if this person -- people who respond to these measures are clinically evaluated by a clinician to make a diagnose.
These scales are standardized on clinical samples. They are standardized -- there is psychometric data showing that these measures are associated with outcomes, disability, impairment in

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functioning and with other measures of eating disorder.
MR. DAVIS: Move to strike as nonresponsive.
BY MR. DAVIS:
Q. Is it -- Doctor, is it fair to say that sitting here today, you can't identify a single study participant in any of the body imaging, eating disorder symptoms, disordered eating or BDD or body dysmorphia studies that you identify that actually had a diagnosed condition of any of those?
MS. EMMEL: Objection --
BY MR. DAVIS:
Q. Right? Any of those medical conditions.
MS. EMMEL: Asked and answered.
MR. DAVIS: I'll withdraw the question.
BY MR. DAVIS:
Q. Doctor, you understand that the screening tools that are used in these studies for eating disorders or body dissatisfaction or BDD, that they have what's called a probable predictive value, correct?

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A. Yep.
Q. Right?
And what a probable predictive value is, is that it's an estimate for those who score high, or certain numbers on a screening tool, that they will actually have a diagnosed condition, correct?
Correct?
A. That is --
MS. EMMEL: Objection, speculation.
A. -- correct.
BY MR. DAVIS:
Q. And so have you gone back and -- have you analyzed at all the probable predictive value for any of the screening tools that were used in the eating disorder symptom studies, the body dysmorphic studies, the disordered eating or the body dissatisfaction studies?
MS. EMMEL: Objection, vague, compound.
A. First of all, predictive value, positive predictive value, which as you said identifies whether this person is going to

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have the condition that -- or probable condition that we are talking about, is very dependent on the context.
So in the context of an eating disorder clinic, the positive predictive value would be very different than a community sample -- than a community sample -- high-risk community sample.
So positive predictive value by itself is not a good measure that we use across contexts, across different prevalence estimates for the condition.
BY MR. DAVIS:
Q. Have you done any analysis on any of the questionnaires used in the eating disorder symptom studies, the body dissatisfaction studies, the studies that looked at body dysmorphia or disordered eating to say what's the error rate from the screening tools or the screening scales that were used and, of those people, how many are -- actually have a diagnosis?
Have you done that analysis specific to the scales used in those studies?
MS. EMMEL: Objection, vague,

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compound, asked and answered.
A. Error goes both ways. So these measures identify some and fail to identify some who have --
BY MR. DAVIS:
Q. I'm not asking you that. I'm asking if you've done the analysis.
A. Sir, let me finish.
When you use these scales, you are -- you are relying on the fact that they have positive predictive value more than chance, and then you look -- compare the groups, group who is using a lot of social media and the group that is using less social media. So the errors, in effect, balance out.
What you're interested in is the effect size. Is it associated with higher risk, higher prevalence?
So positive predictive value in this context is really not a -- is not a deal-breaker. It's not something that anybody would focus on, especially since positive predictive value is very dependent on the base rate of the disorder in different

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settings.
MR. DAVIS: I move to strike as nonresponsive.
BY MR. DAVIS:
Q. I didn't ask you that question, Dr. Mojtabai. You've got to follow my questions, okay. I have limited time with you today. Please follow -- please answer the question I ask, okay?
A. I tried to be response --
Q. You really need to focus on my question.
My question is -- I didn't ask about positive predictive value.
I asked: Have you done any analysis on any of the questionnaires or screening tools used in the eating disorder symptom studies, the body dissatisfaction studies, the studies that looked at disordered eating or body dysmorphia, to see what the error rate is from the screening tools to whether those individuals who filled out the screening tools actually had a diagnosed condition?
MS. EMMEL: Same objections,

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vague, compound, asked and answered.
A. Yeah, positive -- error rate, what you're saying, is one minus positive predictive value.
BY MR. DAVIS:
Q. What -- what analysis -- wait a minute, Doctor.
Have you done an analysis or not? That's what I'm asking you.
A. No, sir. When I'm talking about positive predictive value, I'm responding to your question.
Q. I'm not -- no.
MR. DAVIS: I'm not asking -- let's go off the record.
MS. EMMEL: Can we take a break for a minute?
MR. DAVIS: Yeah, we're going to take a break.
THE VIDEOGRAPHER: We're off the record at 11:11 a.m. That's the end of Media 6.
(Recess taken, 11:11 a.m. to 11:19 a.m. CDT)
THE VIDEOGRAPHER: We're back

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on the record at is 11:19 a.m. This is the beginning of Media 7.
BY MR. DAVIS:
Q. Are you ready to continue, Dr. Mojtabai?
A. Sure.
Q. Okay. I'm going to pick up where we left off, all right?
A. Okay.
Q. Have you done any analysis of the screening scales or questionnaires that were used in the eating disorder symptom studies, the disordered eating studies, the body imaging or body dissatisfaction studies, or the body dysmorphia studies when you looked at the questionnaire and you -- analysis of the questionnaire, compared to whether the scores on the questionnaires actually meant that there was a confirmed diagnosis when that patient was actually evaluated?
Have you done that analysis?
MS. EMMEL: Objection, asked and answered.
A. It's not the standard of

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care -- standard of research in my field, in psychiatric epidemiology, but I haven't done that.
BY MR. DAVIS:
Q. Thank you.
A. Sure.
Q. Look at page 70 of your report.
A. Yes.
Q. There's a Section 8.
Do you see that?
A. Yes.
Q. And it's entitled Both Quantity and Quality of Social Media Use Impact Mental Health.
Right?
A. I see that.
Q. And underneath, in the -- you quote from the Fassi 2024 study, correct?
A. Correct.
Q. And what you say -- you adopt the quote in your report that says that there's a, quote, "need to move beyond time spent measures of social media use" -- well, let me start again. Sorry.
You agree that there's a need

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to move beyond time spent measures of social media use because that's been -- which has been widely acknowledged, correct?
MS. EMMEL: Objection, vague misstates testimony.
MR. DAVIS: Let me rephrase.
THE WITNESS: Yes.
BY MR. DAVIS:
Q. There's a quote in your report from the Fassi article that says: The need to move beyond time spent measures of social media use has been widely acknowledged, as these measures are simplistic and fail to distinguish between types of activities or content that can differentially relate to mental health.
Did I read that correctly?
A. You read it correctly.
Q. You agree with that, right?
A. Not fully. I have to contextualize this because if you look at the title of this section, it says both quantity and quality. Moving beyond, in my interpretation of this is that not only relying on the quantity but also looking at

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the quality of interaction with the social media.
Q. Okay. But you do agree that -- with Fassi that the measures of just looking at time spent on social media are simplistic and fail to distinguish between types of activities or content that can differentially relate to mental health?
MS. EMMEL: Objection, compound.
A. I have to say that time alone is not -- and I think I have said it before. Time alone is not sufficient, unless it is very excessive, like all of the waking hours of the adolescent is spent on social media, in which case, other consequences are included in that.
BY MR. DAVIS:
Q. Right.
A. Forgoing other activities, not being able to give up social media, sleep impairments.
Q. But you would agree, almost all the studies on social media use focused and analyzed time spent on social media use as a

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measure, correct?
A. I would say most of them rely on time, but some include other activities or ways interacting with the social media.
Q. The vast majority of them, though, focus on time?
A. I haven't counted them, but it sounds right, the majority. I don't know if it's vast majority.
Q. And you agree that time alone spent on social media cannot distinguish between what's viewed or heard on social media between other types of activities or features of social media apps, correct?
A. As I said, it could be an indicator, if it is excessive. If it is beyond like 6 hours in our study, in the Riehm study, for example, I think 6 hours is excessive. I would say that that cuts down on the other activities that kids engage in.
Q. Yeah, I think you lost my question.
I was simply asking you that time alone spent on social media can't distinguish between what's being viewed and

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how it's being viewed and other types of activity that takes place on social media, correct?
A. Again, excessive use of social media, I think, hours, means that they are engaging with material that is algorithmic, in other words, the social media is keeping them focused on certain content.
Q. Well, okay.
And you don't know of a study, do you, that kind of separates out use of algorithms from -- well, let me back up.
You don't know -- I'll come back to that.
In your study -- in your reports, I've been able to identify five longitudinal or experimental studies in your reports that analyzed features of social media platforms, okay?
A. Okay.
Q. These are the Kleemans 2018 study, the Tiggemann 2018 study, the Tiggemann 2022 study, the Steinsbekk 2023 study, and the Coulthard 2018 study, okay?
And my question to you is: Are

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there any others?
MS. EMMEL: Objection, vague.
A. I'm sure new studies are coming out all the time. So are there other studies now, I don't know. I haven't done a literature review recently that I've looked at it, so I can't answer that.
BY MR. DAVIS:
Q. Do you know of any other, other than the five that I identified, from your expert reports?
A. I don't, no.
Q. Okay. Let's talk about -- let's talk about those.
(Whereupon, Mojtabai-42, Picture Perfect: The Direct Effect of Manipulated Instagram Photos on Body Image in Adolescent Girls, by Kleemans et al, was marked for identification.)
BY MR. DAVIS:
Q. This is Exhibit 42, which is the Kleemans 2018 paper, okay?
MR. DAVIS: Can we go off the record?
THE VIDEOGRAPHER: We're off

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the record at 11:28 a.m. That's the end of Media 7.
(Recess taken, 11:28 a.m. to 11:29 a.m. CDT)
THE VIDEOGRAPHER: We're back on the record at 11:29 a.m. This is the beginning of Media 8.
BY MR. DAVIS:
Q. All right. Dr. Mojtabai, do you see that what's marked as Exhibit 42 is the Kleemans 2018 paper that's referenced in your expert report?
A. I do.
Q. Okay. And this was a very small study in terms of a sample size with only 144 study participants, right?
It's on the abstract.
A. Yes, I see that.
Q. And what this study did was it used manipulated Instagram photos and assessed the impact of how those were visually responded to, right?
A. That's correct.
Q. And what they did is they took manipulated and unmanipulated images and saw

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how study participants reacted to those images, correct?
A. That is correct.
Q. Right.
And the reaction was basically, it was -- there were ten selfie photos that were used by the study participants and reviewed, right?
A. Either ten original Instagram photos or ten manipulated photos, so there are two conditions.
Q. Right.
And what they did was they were assessing the immediate reaction to what the participant saw, correct?
A. That's my understanding from reading this.
Q. Right.
There wasn't any type of long-term assessment to see how those reactions may have impacted mental health over time, correct?
A. I don't know the context, but it's -- it's an experimental study, so I assume it was after the intervention, they

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measured the outcomes.
Q. Right.
But there wasn't -- other than the momentary assessment of the reaction to the images, the study participants weren't followed up to see if that ended up having any type of clinically significant or diagnosed disorder, correct?
A. That is my understanding, yes.
Q. Okay. Let's look at -- let's look at the next one, which is Tiggemann 2018. We'll mark that as Exhibit 43.
(Whereupon, Mojtabai-43, The effect of Instagram "likes" on women's social comparison and body dissatisfaction, by Tiggemann et al, was marked for identification.)
BY MR. DAVIS:
Q. This is an article that's entitled "The effect of Instagram 'likes' on women's social comparison and body dissatisfaction."
Right?
A. Yep.
Q. Again, it was a very small

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sample size of only 220 female undergraduate students, correct?
A. Well, small -- I have to qualify that. You have different sample sizes for different types of studies.
For a survey, you would have thousands of people. For a study like this, you may actually have smaller, and that would be sufficient.
Q. Right.
A. So identifying it as small, I'm not sure in this category of studies, if it's small or not.
Q. Okay. You wouldn't describe it as a small study?
A. Depends on what type of -- what design it is.
Q. It's an experimental study.
A. Well, then I wouldn't identify it as small.
Q. Okay. Well, you've got 220 female undergraduate students.
These aren't -- these aren't teens, children or adolescents, are they?
A. Undergraduate students are

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young adults, I would say, or emerging adults.
Q. Okay. And what they did here is -- if you look at page 93, on the left-hand column under Section 2.3.1.
A. 3.1, yes.
Q. Oops. Oh, it's actually on page 92. Sorry.
What they did is they said two sets of stimulus material were constructed for the study, each containing 15 Instagram images of thin, ideal or average women, respectively, correct?
A. Uh-huh.
Q. Yes?
A. That's correct, that's what they have.
Q. So what they're doing in this experimental study is they're showing images to the study participants --
A. Right.
Q. -- and getting their reaction to what the -- what the study participants see in the images, right?
A. That's correct.

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Q. Okay. And they also put in more likes for a group and less likes for another group with respect to the images, correct?
A. Right.
Q. And then they measured how the study participants reacted to what they were seeing in the images and the number of likes that went along with the images, correct?
A. That is my understanding from reading it.
Q. Yeah. This study found no effect on the number of likes with respect to body dissatisfaction, true?
A. I have to look at the results.
Q. Look at the abstract on page -- third-to-last sentence, it says, quote: While the number of likes had no effect on body dissatisfaction or appearance comparison, it had a positive effect on facial dissatisfaction.
Do you see that?
A. Yes.
Q. So for body dissatisfaction, this study found no effect with respect to

Page 566

the likes, correct?
MS. EMMEL: Objection, misstates the document.
A. Yeah, the -- but they did find one for facial dissatisfaction.
BY MR. DAVIS:
Q. Yeah. I promise you, we're going to get there.
A. Okay.
Q. But this study found no effect between use of social media and likes with respect to body dissatisfaction, right?
A. That is what they state.
Q. And for the facial dissatisfaction, what this -- what these researchers found is that when the images were shown and the study participants responded to what they saw about the images, some had an effect with respect to facial dissatisfaction, right?
A. That is what they state, yes.
Q. Right.
And this -- these were also momentary assessments of reactions by the study participants, correct?

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A. To the extent you can call responses to a -- or results of an experiment like this -- because momentary could mean that it disappears --
Q. No, no, I meant like the time period.
MS. EMMEL: Wait, wait, he wasn't finished.
BY MR. DAVIS:
Q. I'm talking about the time period by which the images were shown and the reaction to them.
That process was very momentary, right?
A. So I would restate it: Shortly after the trial. We don't know if it's momentary. Momentary means that it disappears after time.
Q. Right.
A. It is not necessarily momentary.
Q. Right.
But this study, then, didn't follow study participants to determine whether any of the patient -- or the

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participants who reported facial dissatisfaction went on to develop any eating disorder or BDD, did it?
A. I wouldn't expect a study like this to do that because that's not the standard. But you're -- you're correct.
Q. Right.
A. They didn't do that.
Q. And so in terms of whether or not the facial dissatisfaction rose to the level of some clinically significant problem, that wasn't assessed in this study, was it?
MS. EMMEL: Objection, vague.
A. It wasn't one of the aims of this study.
BY MR. DAVIS:
Q. Right. This wasn't looked at?
A. It wasn't the aim of the study, as I said, yeah.
Q. Let's look at -- let's look at Tiggemann 2020.
(Whereupon, Mojtabai-44, Uploading your best self: Selfie editing and body dissatisfaction, by Tiggemann et al, was marked for

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identification.)
BY MR. DAVIS:
Q. This is an article that's entitled "Unloading your best self: Selfie editing and body dissatisfaction."
Do you see that?
A. It says "Uploading." That's -- Uploading your best self. Is that the paper?
Q. Yes, sir.
A. The selfie editing, yes.
Q. Okay. And if you look at page 176.
A. Yes.
Q. Right-hand column, Section 2.2.1.
A. Right.
Q. What they did in this study is that it exposed participants in the study to one set of 15 Instagram images constructed by the researchers that contained thin or average size women, right?
A. That's my understanding, reading this.
MS. EMMEL: Objection, misstates the document.

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BY MR. DAVIS:
Q. Right.
And what they -- what they did is they were then showed these two sets of images to the study participants and recorded or documented how they responded to what they saw in the images, right?
MS. EMMEL: Objection, compound, vague.
A. First of all, the images had initially been sourced from public Instagram profiles using hashtags, so they're not just images. They're -- they're images taken from --
BY MR. DAVIS:
Q. Yeah, I'm not suggesting otherwise. I'm just saying that they took two sets of 15 Immigran- -- 15 Instagram images --
A. Right.
Q. -- and they showed them to the study participants, and then they got the reactions of the study participants to what they saw, right?
A. That is my understanding.

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Q. Right.
And they, again, made an assessment, like the moment -- strike that.
They then did a momentary assessment of whether or not they had body dissatisfaction, facial dissatisfaction or negative mood, right?
A. Again, momentary is -- implies transient. We don't know if it was transient or not. So I would say immediately after the intervention, they looked at these outcomes.
Q. But the -- but as you point out, that this study doesn't have data showing that the reactions to the images were more than transient, right?
A. They don't show any evidence either way, whether they were transient or more than transient. So we don't know that.
Q. Okay. And this study assessed the reaction to selfie editing by study participants on body image concerns, right?
A. That is my understanding, yes.
Q. Okay. And if you look at page 180 under Discussion.
A. Yes.

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Q. First paragraph, second sentence, it says: The findings are relatively clear. In contrast to prediction, induced state body and facial dissatisfaction did not affect any selfie behavior and, in particular, did not result in increased editing of the taken selfies.

Do you see that?

A. I see that.

Q. So this study didn't find an effect between selfie behavior and body dissatisfaction or facial dissatisfaction, right?

A. It's -- the next sentence talks about --

Q. I'll get to the next sentence, I promise.

But that's what it found, right?

A. Yes.

Q. Yes?

A. Yes.

Q. Okay. And then the next sentence says: However, as predicted, the taking and editing of selfies led to

Page 573

increased negative mood and state facial dissatisfaction, regardless of experimental condition.

Correct?

A. That's what it says.

Q. So what they were saying is that regardless of whether you were in one of the two groups, you had a similar reaction to the -- what you were seeing in the images, right?

MS. EMMEL: Objection, vague.

A. The taking -- to the, yeah, taking and editing of selfies specifically.

BY MR. DAVIS:

Q. And there's no evidence from this study, because it doesn't provide the data, about whether the body dissatisfaction or the facial dissatisfaction or the negative mood resulted in clinically significant symptoms, right?

MS. EMMEL: Objection, misstates the document.

A. I have to look at the state facial dissatisfaction measure that they used, and it might actually be significantly

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related to -- and I suspect it is, to body -- or facial dysmorphophobia.

BY MR. DAVIS:

Q. I don't think --

MR. DAVIS: Move to strike as nonresponsive.

BY MR. DAVIS:

Q. I don't think you're following my question.

There's no evidence from this study that whatever reaction that the study participants had to what they saw, that that resulted in them having to be treated clinically for body dissatisfaction, facial dissatisfaction or negative mood, right?

MS. EMMEL: Objection, compound.

A. Not from this --

MR. DAVIS: Go ahead.

A. Not from this study.

BY MR. DAVIS:

Q. Right.

Let's look at Coulthard. This is Exhibit 45.

(Whereupon, Mojtabai-45, The

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impact of posting selfies and gaining feedback ("likes") on the psychological well-being of 16-25 year olds: An experimental study, by Coulthard et al, was marked for identification.)

BY MR. DAVIS:

Q. This is a study entitled "The impact of posting selfies and gaining feedback ('likes') on the psychological well-being of 16-25-year-olds: an experimental study."

Correct?

A. Correct.

Q. And there were only 59 participants in this study, correct?

A. That is correct.

Q. And what they did in this study, if you look at the abstract, they assessed the impact of posting selfies and receiving feedback ('likes') on Instagram on broader aspects of the psychological well-being of young people.

Right?

A. Right.

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Q. And what they did is they did three conditions. They had a condition for a 7-day intervention where there was no selfie posting.
A. Yes.
Q. Then they did posting selfies without feedback, and then they did posting selfies with feedback, correct?
A. That is correct.
Q. Okay. And then they did a one-week follow-up afterwards, correct? Right?
A. That's what they say.
Q. So the length of the study is a week, right?
A. That is what they say.
Q. Okay. And if you turn to page 218 -- excuse me, page 7.
A. They're not numbered. I'm sorry.
Q. Here, if you hand me your page, I'll find it for you.
A. Thank you.
Q. Okay. Do you see in the Discussion section, this study showed: No

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impact of either posting selfies or receiving feedback on measures of self-esteem or positive or negative mood.
Did I read that correctly?
A. You read it correctly.
Q. So this study doesn't show that posting selfies or receiving or posting likes had an effect on the study participants, correct?
A. An effect -- I mean, they talk about other effect that they get posting, so posting no selfies resulted in a greater improvement in appearance satisfaction over the study compared to posting selfies.
Q. But these results -- let's just -- I'll get to that in a second.
That this study showed that there was no impact of either posting selfies or receiving feedback on measures of self-esteem or positive or negative mood, correct?
A. That is what they state, yes.
Q. And you mentioned that -- again, this study doesn't provide any data about whether whatever reaction the study

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participants had, that any of the feelings or reactions that they had to the images resulted in clinically significant symptoms, right?
A. That is my understanding. I don't think that that was what they were studying.
Q. Okay. All right. Let's look at the next study, which is Exhibit 46.
And -- and I guess just -- just to be clear about Coulthard, right?
What's happening in that study is that people are responding to what they're seeing about likes or postings, and they're reacting to what they're seeing, right?
A. They are also posting selfies.
Q. Yes, they're posting -- which would be --
A. Or not.
Q. Right. They're responding to what they're seeing and then adding postings themselves in terms of responding to what they're seeing.
MS. EMMEL: Objection, vague.
A. Well, what they do -- let's

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just read the method again.
(Document review.)
A. So there are three arms, no selfie control. They don't post any selfies, and then there are selfies with no feedback and selfies with feedback. So feedback comes after selfies, if their selfie receives a lot of likes or not. And those are the three arms they're comparing. That's my understanding of this --
BY MR. DAVIS:
Q. Right. And so what they're doing is if they get a like or not --
A. After this --
Q. -- after they visualize what they see, right, in the images, then they respond to it?
A. I don't think it's only visualizing. When you post a selfie, it's a selfie of the person themselves. They take a picture of themselves and post it.
Q. Right. And so -- and so what they're doing is they're choosing whether or not to post something to others, right?
A. Well, they -- it's one of the

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intervention arms. They don't have a choice. They are either assigned to an intervention arm where they post selfies or to another intervention arm where they do not.

Q. Okay. I've handed you what's been marked as Steinsbekk 2023. That's --

(Whereupon, Mojtabai-46, Social media behaviors and symptoms of anxiety and depression. A four-wave cohort study from age 10-16 years, by Steinsbekk et al, was marked for identification.)

BY MR. DAVIS:

Q. This was a longitudinal study that followed adolescents over six years, correct?

A. If you give me a...

I'm looking at it to see. It's a random intercept cross-lagged panel model, yes.

(Document review.)

MR. DAVIS: Let's go off the record while Dr. Mojtabai reviews that.

THE WITNESS: Yeah.

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THE VIDEOGRAPHER: All right. We're off the record at 11:51 a.m. That's the end of Media 8.

(Recess taken, 11:51 a.m. to 11:54 a.m. CDT)

THE VIDEOGRAPHER: We're back on the record at 11:54 a.m. This is the beginning of Media 9.

BY MR. DAVIS:

Q. Dr. Mojtabai, my question was: This is a longitudinal study that followed adolescents over six years, correct?

A. That is -- that's my understanding, yes.

Q. And this study actually did structured clinical interviews of study participants and parents using actual DSM criteria to assess for symptoms of depression or anxiety, right?

A. They apparently did, yes.

Q. And are you aware of any other observational study or experimental study that used structured clinical interviews to assess study participants?

A. As I said, it's not common.

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It's not a standard in the field. We usually use scales or questionnaires.

Q. You're not aware of one, right?

A. I'm not aware of this.

Q. And do you agree that this is a well-designed study?

A. I don't see any fatal flaws in the design of the study.

Q. You don't set out any criticisms of Steinsbekk in either of your reports, do you?

A. I don't recall having brought up any.

Q. You don't know of any criticism that you put in your report, right?

A. If -- looking at this, if I have any criticism, it's about the cross-lagged models.

Q. Okay. Now, this study found that -- if you look at the abstract, this study found that: Frequency of posting, liking and commenting is unrelated to future symptoms of depression and anxiety.

Correct?

A. This is what they state.

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Q. Right?

In other words, they didn't find any causal effect or relation between those features of social media and any symptoms of depression or anxiety, correct?

A. I disagree with that, because this is a cross-lagged study. They are only looking at within-person change. Within-person change is dependent on fluctuations.

If you have a measure that is reflecting of a state, like depression, you wouldn't expect much variation or fluctuation across the different waves of assessment.

MR. DAVIS: I move to strike as nonresponsive.

BY MR. DAVIS:

Q. I wasn't asking you if you agreed with it or not.

I'm just saying that these study authors didn't report out any causal effect or relation between the features of social media that they analyzed and any symptoms of depression or anxiety, correct?

MS. EMMEL: Objection,

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misstates the document.
A. Yeah, I'm going to read what they say. They say: The frequency of posting, liking and commenting is unrelated to future symptoms of depression and anxiety.
BY MR. DAVIS:
Q. So they didn't find an association between the features that they analyzed and symptoms of anxiety or depression, correct?
A. No within-person change or association, you may say.
Q. Okay. Now, with respect to each of the five studies that we went over, right --
A. Uh-huh.
Q. -- none of them specifically analyzed the effect of algorithms on effects for study participants, correct?
A. The studies that we looked at?
Q. Yes, the five we just went over.
A. Well, I wouldn't -- I would argue that the study that looked at the likes, number of likes that people received

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on their doctored postings, doctored selfies, for example, or selfies, even, that is indicative of an algorithmic feature of the -- of the apps that allows the likes to surface.
Q. What -- what study are you referencing?
A. I'm talking about the study we talked about, about feedbacks and posting -- feedbacks on post -- selfie posting by Naomi Coulthard and Jane Ogden.
Q. Okay. But in the article, right, in the article itself, we're not going to find any discussion of -- or analysis by the study authors about the impact of algorithms on their study, correct?
A. I haven't memorized the paper. I don't know if they talk about algorithm or not or algorithm --
MR. DAVIS: Let's go off the record, if you want to take a look at it.
THE VIDEOGRAPHER: We're off the record at 11:58 a.m. That's the end of Media 9.

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(Recess taken, 11:58 a.m. to 12:00 p.m.)
THE VIDEOGRAPHER: We're back on the record at 12:00 p.m., beginning Media 10.
A. So I don't see any specific reference to algorithms, but they talk about all the selfie -- selfies have become an integral part of social media.
BY MR. DAVIS:
Q. Okay. So in Coulthard and -- doesn't specifically analyze algorithms, correct?
A. It does not specifically analyze algorithms.
Q. And none of the other studies do either, right?
A. None of the studies we talked about --
Q. None of the other four.
A. Yes.
Q. Okay. For any of the experimental studies that you analyzed, did any of them follow patients to see whether -- strike that.

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For any of the experimental studies that you analyzed, did any of them -- and I'm not -- let me back up.
I'm not talking about these five that we just went over, okay, because we've already covered those.
A. Okay.
Q. But any of the other studies, experimental studies that you analyzed, did any of them determine that the reactions to either using social media or reducing social media or having a limited use of social media result in symptoms that they had to go get treatment for?
MS. EMMEL: Objection, vague and ambiguous, compound.
A. Well, this is not, again, the purpose or the design of these experimental studies. They're assessing the outcomes after the experiment or looking at the effect of restrictions on use of social media and -- in terms of, again, mood or other outcomes, social comparison, that is measured using standardized scales.
///

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BY MR. DAVIS:
Q. But did any of the experimental studies determine that any of the study participants had clinically significant symptoms?
A. The studies I looked at, they didn't state that that was the aim of their study, to examine the association with the clinical outcomes. As a result, I haven't seen any.
Q. So they just didn't have -- all the studies just didn't have data on that?
A. That wasn't part of their design or analysis.
Q. Right.
So they didn't have the data on it?
A. I assume they did not collect the data.
Q. Right.
And you haven't seen it, have you?
A. I have not.
Q. Okay. Was there any study that you analyzed for either of your reports that

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was able to separate out the impact of what was viewed or heard on social media platforms by the participants in the study?
MS. EMMEL: Objection, vague.
A. Can you rephrase it?
BY MR. DAVIS:
Q. Right.
The studies that you looked at --
A. Yes.
Q. -- right? All of the ones in your expert reports, analyzed how study participants are reacting to what they see or hear on social media, right?
A. Or how they interact with the social media.
Q. Right, but mostly -- right.
I think we went over the ones in terms of how they interact, right? Okay. But set aside those five, okay? Set aside those five studies.
Any other study in your report that specifically -- strike that.
Other than the five studies we've already gone over, any other study

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identified in either of your reports that separated out from the study results how the study participants responded or reacted to what they saw or heard on social media?
MS. EMMEL: Objection, vague, asked and answered.
A. Again, I would ask for clarification. Are we talking about the content of what they saw on social media or how they reacted to --
BY MR. DAVIS:
Q. I'm just asking you -- I'll rephrase the question.
Other than the five studies that we all -- that we went over --
A. Yeah.
Q. -- were there any studies that were able to separate out through the design of the study the impact of what the participants were seeing and viewing on social media and how that impacted the results of the study findings?
MS. EMMEL: Objection, vague.
A. Well, there are experimental studies that use material and change the

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content or expose participants to different contents and then measure their -- their reaction or outcomes --
BY MR. DAVIS:
Q. Right.
A. -- what they see on that -- on their tablet or phone or --
Q. Sure.
And then the observational studies essentially did the same thing, right?
A. Well, some observational studies are -- as we talked about, they looked at the hours that people spent with social media.
Q. Right.
A. Some of them looked at the problematic use of social media, how pervasive and how salient and how loss of control is associated with use of social media.
So -- and some of them looked at -- especially experimental studies exposed participants to different types of content and then assessed whether mood change or

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change in social comparison is induced by that.
Q. Right.
A. I don't know if I answered your question.
Q. You're helping. I think I'm following you.
What you're talking about is in your reports, what you're talking about when it comes to the observational data is that you assessed how study participants reacted to what they were seeing, right, the content on the social media platforms, and they responded to that, and that's -- that was a part -- an integral part of what the study results showed?
MS. EMMEL: Objection, misstates testimony and reports.
A. I would say some of the studies are as you described them, but not all of them.
BY MR. DAVIS:
Q. Can you identify any observational study that doesn't fall into that category?

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A. Can you -- you have to be more specific, I'm sorry. What that category, what is -- is it the content that they saw that they reacted to?
Q. Yeah.
Is there -- are there any observational studies that you're aware of that did not include some measure of a response or reaction to what was being seen or heard by the study participants to social media and how they responded or what they saw or heard?
MS. EMMEL: Objection, vague, compound.
A. Again, I try to, in my mind, like, set this study -- what that study would look like that you're describing, and I'm not sure what they saw, what it -- what's meant by what they saw.
BY MR. DAVIS:
Q. Sure. So let me see if I can rephrase.
A. Yeah.
Q. Is there any observational study in your mind that didn't -- let me

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strike that.
All the observational studies that you're aware of, what they did is they were assessing how participants in the study reacted and responded to content on social media and whether or not that was impacting them in terms of adverse mental health outcomes, right?
A. Right.
Q. Okay.
A. Yes.
Q. Okay. All righty. Let me -- let me ask you some questions about your Bradford Hill criteria.
A. Okay.
Q. You didn't do --
If you want to look at it, you've got it. I think it's at the back end of your report, right?
A. Sure.
Q. To make your causal assessment in this case, you used the Bradford Hill factors, correct?
A. Or perspectives, what he calls factors, maybe. It's not criteria. Yeah.

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Q. Let's just use factors, okay?
A. Okay.
Q. Is that all right with you?
A. That's fine.
Q. Okay. And your expert report doesn't do a Bradford Hill causation analysis specific to eating disorders, does it?
A. It doesn't do a Bradford Hill analysis specific to any of the outcomes. It does it for all outcomes.
Q. Okay. So what you did is when you did your Bradford Hill causation -- strike that.
When you did your causation analysis --
A. Yes.
Q. -- you put all the outcomes together in a pot and you did your analysis from there, correct?
A. That is, yes, correct.
Q. Okay. And you didn't separate -- in your causation analysis, you didn't separate out any of the individual defendants in this case and look at the data specific to their platforms and usage of

Page 596

their platforms and make the causation assessment about each individual defendant, did you?
A. There is not sufficient data for each individual platform, and besides, children nowadays are using three or more platforms on average. So it's not really feasible to do that for each individual platform.
Q. So in terms of your causation assessment, what you did is you took data on each of the individual defendants, you combined it, right, and made an assessment of causation based upon that combined data?
A. By defendant, you mean platforms, different --
Q. Yes.
A. Yeah, I wasn't thinking about individual platforms when I was doing the causal analysis because there is a lot of commonality across social media, and children use multiple social media platforms, so it's not really feasible to separate.
Although I have a section in my report that talks about specific features and

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some studies that have investigated association of those features with the outcomes.
Q. Right. Right. I understand.
But just so we're clear, when you did your causation assessment for this case as reflected in both of your reports, what you did is you combined the data as to each individual defendant and the individual defendant's platforms, and you combined all that data together to get to your causation opinion, right?
MS. EMMEL: Objection, asked and answered, misstates testimony.
A. For the reason I specified before, my causal analysis is inclusive of all social media platforms.
BY MR. DAVIS:
Q. Yeah. And I -- I think I'm just -- I just wanted clarity.
It's -- you combined all of the data with respect to each of the individual defendant's platforms into your causation analysis, correct?
MS. EMMEL: Objection, asked

Page 598

and answered.
A. I think a better way to say is that I did not separate them.
BY MR. DAVIS:
Q. And -- hold on one second.
You didn't -- in your causation assessment for this case and as reflected in your expert reports, you didn't separate out individual psychiatric disorders and do a Bradford Hill causation analysis with respect to each individual disorder that's identified in your report, did you?
MS. EMMEL: Objection, asked and answered.
A. Again, I think I did not separately conduct a Bradford Hill assessment for each individual outcome, if that's your question.
BY MR. DAVIS:
Q. Yeah. Thank you. Okay.
So then the other thing is --
MR. DAVIS: Why don't we do this. It's 12:00. Why don't we take a break for lunch.
THE WITNESS: Okay. Let's do.

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THE VIDEOGRAPHER: Off the record at 12:14 p.m. That's the end of Media 2.
(Recess taken, 12:14 p.m. to 1:03 p.m. CDT)
THE VIDEOGRAPHER: We're back on the record at 1:03 p.m. This is the beginning of Media 11.
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EXAMINATION
---
BY MS. COATES:
Q. Good afternoon, Dr. Mojtabai.
A. Yes, ma'am.
Q. We've been sitting in the same room for a day and a half, but I don't think we've been introduced. My name is Melissa Coates, and I represent Google and YouTube in this litigation.
So I'm going to ask you some questions -- further questions about your report, but I'm going to focus my questions specifically on Google and YouTube. And I have very limited time, so if you could listen to my questions and answer the

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question asked, it would be greatly appreciated so I can get through everything I have.

To start with, what is YouTube?

A. My understanding of YouTube is a social media site where people can post videos and also interact with each other, share videos and receive also feedback on comments or videos they put in.

Q. Okay. And when you say that they can interact with each other, how do they do that on YouTube?

A. Usually through comments that they write or likes that they give to each other's comments.

Q. To the specific video that's --

A. To the specific video or --

Q. -- on the platforms?

A. -- previous comments.

Q. Okay. Thank you.

And focusing on what's been marked as Exhibit 5, your -- we can continue using that, your April 18th report.

A. Right.

Q. Under Section 6, which was

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entitled Potentially Harmful Features of Specific Social Media Platforms --

A. Yes.

Q. -- you only reference YouTube in Section 6.12, correct?

A. Yeah. Each subsection focuses on one of the platforms for which I could find data.

Q. And the studies cited here in Section 6.12 are the only YouTube-specific studies cited in your report, correct?

A. I believe that to be the case.

MS. EMMEL: Objection, misstates the report.

BY MS. COATES:

Q. And you don't reference any features of YouTube in this section, do you?

A. If you give me a moment to look at what I say here and what I talk -- the studies that I talk...

(Document review.)

MS. COATES: If you need to look at your report, we can go off the record.

THE VIDEOGRAPHER: All right.

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We're off the record at 1:06 p.m. That's the end of Media 11.

(Recess taken, 1:06 p.m. to 1:06 p.m. CDT)

THE VIDEOGRAPHER: Back on the record at 1:06 p.m. This is the beginning of Media 12.

A. In response to your question, I don't see any mention of specific features of YouTube in this section on YouTube.

BY MS. COATES:

Q. Thank you.

And so let's look at the studies that you do cite in this section.

I'll mark as Exhibit 47 the Balcombe study that you reference on page 67.

(Whereupon, Mojtabai-47, The Impact of YouTube on Loneliness and Mental Health, by Balcombe et al, was marked for identification.)

A. Thank you.

BY MS. COATES:

Q. And this is Balcombe et al 2023, The Impact of YouTube on Loneliness and Mental Health, Informatics.

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You said in your report at page 67, for the proposition that YouTube is the world's most used streaming platform and hosts numeral [sic] social media communities, correct?

A. That is correct.

Q. And if you turn within the report -- or the study itself, on page 14 of 20, Section 6.2 is Limitations.

Do you see that?

A. Yes.

Q. And here, the study authors note: No causal association was established between the use of YouTube and loneliness, slash, mental health issues because of the heterogenous findings and the difficulties of quantifying mental health.

Do you see that?

A. I see that sentence.

Q. And heterogenous findings here in this -- as it's used in this study refers that the study they examined found some negative associations between YouTube and mental health, but also some positive associations between YouTube and mental

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health, particularly as a source of education about mental health and a resource for individuals.
Correct?
A. You're reading, I'm sorry, from someplace in the paper?
Q. No. I'm asking you your understanding of the study and its heterogenous findings.
MS. EMMEL: Objection, compound question.
A. Without reading it, I can't tell if this is what they meant when they said heterogenous findings or looking at the specific section where they talk about. If you could point me to that, I would appreciate it.
BY MS. COATES:
Q. Okay. If we look in the paragraph above Limitations.
A. Yes.
Q. In the second sentence, the authors write: There is also support for the potential of YouTube to increase awareness of and access to mental health screening and

Page 605

services for vulnerable adolescents. However, there is no evidence to suggest an association between adolescents' digital technology use and an increase in mental health problems.
Do you see that?
A. I see that.
Q. And you don't disagree with that statement, correct?
MS. EMMEL: Objection, vague.
A. I do not agree as a blanket statement as it is stated here.
BY MS. COATES:
Q. And you cited this study in your report, correct?
A. I did.
Q. And you did not note in your report your disagreement with this study, correct?
A. I did not specify my disagreement or agreement with each individual study in the report. You are correct.
Q. Okay. In the next paragraph of your report in Section 6.12, you cite the

Page 606

de Bérail 2019 study.
Do you see that?
A. I see that.
Q. I'll give you a copy of the de Bérail study. We can mark it Exhibit 48.
(Whereupon, Mojtabai-48, The relations between YouTube addiction, social anxiety and parasocial relationships with YouTubers: A moderated-mediation model based on a cognitive-behavioral framework, by de Bérail et al, was marked for identification.)
BY MS. COATES:
Q. This article is titled "The relations between YouTube addiction, social anxiety and parasocial relationships with YouTubers: A moderated-mediation model based on a cognitive-behavioral framework."
Correct?
A. That is correct.
Q. And on page 67 of your report, you described the de Bérail study as: An international survey study of over 900 adolescents and young adults (mean age 21

Page 607

years) found that they spend an average of 6.3 hours per week on YouTube.
Do you see that?
A. Yes.
Q. So the average study participant spent less than an hour a day on YouTube, correct?
A. If you divide it by seven, this is correct.
Q. And do you know how that compared to the amount of time they spent doing other daily activities?
A. If they have stated in the paper, I don't recall.
Q. Okay. And if you look on that first page, in the column on the right under the abstract.
A. Yes.
Q. The paragraph starts: YouTube does not possess all the social networking functionalities and is best characterized as a content community within the scope of social media sites. Whereas SNS -- and that's described -- defined earlier as social networking sites -- are more focused on

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relationships between users, YouTube is focused on content viewing.
Do you see that?
A. I see that.
Q. And you don't dispute the authors' description of YouTube, do you?
A. I think it is vague in saying that -- possess all the social networking functionalities. I mean, what are the all? That is not very clear to me, what they're talking about in terms of social network functionalities.
So it says all -- it does not possess all the social network functionalities. It doesn't say what it doesn't include specifically.
Q. And do you know?
A. Well, there are some features on specific social media that I know that are specific to those, like Snapchat has the Snapchat Maps or Streaks, and so those are specific to certain apps.
But I don't know when they say all social network functionalities, do they refer to those, or are they -- I don't know.

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Q. And does YouTube have functions like Snap Maps or Streaks?
A. It doesn't have those.
Q. You cited this study in the report, correct?
A. I did, yes. That report is in my -- that study is on my -- in my report.
Q. And you didn't note in your report any disagreement with the description of YouTube in this study, correct?
A. I did not specify the specifics of each one of the studies in my report, no.
Q. Did you do anything to assess the differences between YouTube and the other social media platforms in this litigation?
A. To the extent of familiarizing myself with the most important features of each one of the platforms and studies that have specifically looked at those specific features, I have.
Q. And where is that analysis in your report?
A. Well, where I talk about -- I mentioned the Snapchat, where I talk about the Snap Maps or Streaks, I talk about that.

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I talk also about the visual nature of Instagram and TikTok, so short-video addiction. Where I talk about that, I talk about those features.
So -- and also personalizing of the content for TikTok, I talk about that in the report.
So there are places where I specifically talk about specific features of some of these social media apps that are -- especially have been studied in terms of the relationship with mental health outcomes.
Q. Okay. So in your answer you just mentioned Snapchat, TikTok, but you did not mention YouTube, correct?
A. I didn't mention YouTube, correct.
(Pause.)
MS. COATES: I'll come back to it, I can't find it.
BY MS. COATES:
Q. And if you turn to page 193 of this study, the de Bérail study --
A. Yes.
Q. -- Section 2.2.1.

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A. Yes.
Q. And here the authors state: There is currently no specific validated scale to measure YouTube addiction severity.
Did I read that correctly?
A. You read it correctly.
Q. Do you disagree with this statement?
A. This study was published in 2019. I think there are studies validating the Bergen -- well, I take it back.
I'm not aware of any specifically for YouTube.
Q. Thank you.
And this study examined social anxiety, parasocial relationships and YouTube addiction that was based on those unvalidated scales, correct?
A. I'm looking at...
Can you repeat your question?
Q. The study examined social anxiety, parasocial relationships and YouTube addiction that was based on those unvalidated scales, correct?
MS. EMMEL: Objection,

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foundation.
A. Yeah, I don't think the social anxiety measures are -- they don't talk about social anxiety measures or parasocial relationships as measures that have -- or attachment style as measures that haven't been validated. They talk about only YouTube severity measures not being validated.
BY MS. COATES:
Q. Yes. My -- okay. Let me ask.
The study examined social anxiety, parasocial relationships, and YouTube addiction where the YouTube addiction was based on the unvalidated scales, correct?
A. That is my understanding.
Q. It does not analyze depression, correct?
A. It's not one of the measures included.
Q. It does not analyze generalized anxiety disorder, correct?
A. To the extent that social anxiety overlaps with generalized anxiety, it might generalize to that condition also, symptoms of generalized anxiety, but it does

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not specifically measure generalized anxiety.
Q. It does not analyze anxiety apart from social anxiety, correct?
A. I don't see any other measures of anxiety besides that measure of social anxiety, the Liebowitz.
Q. It did not analyze any eating disorders, correct?
A. In -- not in this paper, no.
Q. And it did not analyze any suicidal behaviors, suicidal ideation or suicidality, correct?
A. Looking at it...
I don't see any measures of suicidality separate from what might be related to social anxiety, so no, I don't see any measures of suicidality.
Q. Thank you.
And the authors hypothesized that social anxiety was a driver of what they termed "YouTube addiction," correct?
A. That is -- if you point me to that hypothesis -- oh, yeah.
I read the page 1, and just tell me if that's what you mean: Social

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anxiety will be positively associated with YouTube addiction.
That was their first hypothesis.
Q. Thank you.
The authors of the de Bérail study stated that participants must be over 18 to complete the questionnaire, correct?
That's back in Section 2.1 on page 193.
A. 2.1 -- okay. Yeah.
(Document review.)
A. Participants must be over 18 to complete the questionnaire, yes.
BY MS. COATES:
Q. And if we turn to page 199, Section 4.3.
A. Yes.
Q. Under Section 4.3, the second paragraph, the authors noted, as a limitation, that future research should be conducted among adolescents and middle and high schools to enhance the generalizability of the findings -- of the current findings, correct?

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A. That's what they state.
Q. And if you look at the last paragraph before Section 4.4, the authors also note that the study uses only cross-sectional data, correct?
A. That is correct.
Q. Okay. We can put that one aside, and I'm going to mark the next study that you looked at as -- Klobas 2018 as Exhibit 49.
(Whereupon, Mojtabai-49, Compulsive YouTube usage: A comparison of use motivation and personality effects, by Klobas et al, was marked for identification.)
A. Thank you.
BY MS. COATES:
Q. This article is titled "Compulsive YouTube usage: A comparison of use motivation and personality effects."
The study administered a survey questionnaire to a convenience sample of Malaysian university students, correct?
A. The description of the sample you provided is -- I'm looking for -- to find

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that.
Participants...
(Document review.)
BY MS. COATES:
Q. It's under Section 3.2.
A. Yeah. They don't mention, as you said, convenience --
Q. If you look in the second paragraph.
A. Yeah.
Q. A convenience sample was taken in person --
A. I see that.
Q. -- from students at different locations across the university.
Do you see that?
A. I see that. Yes, I see that.
Q. Okay. And in your report on page 67, you write: These authors distinguished between "compulsive use" of YouTube and "YouTube addiction." Compulsive use was defined by users' inability to limit their use, while addictive use was defined by the need to increase interactions for gratification, and experiencing significant

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negative effects of such use on physical or mental health, relationships, or other aspects of their life in addition to compulsive use. Thus, compulsive use is part of addictive use, but addictive use encompasses a much more extensive involvement with the platform and its adverse outcomes.
Correct?
A. That's what I write here.
Q. Okay. And while the authors do make that distinction in the section on compulsive use, 2.2, the study itself reports only on compulsive use and does not report on addiction, correct?
A. If you give me a moment to look at it.
MS. COATES: Go off the record, please.
THE WITNESS: Sure.
THE VIDEOGRAPHER: We're off the record at 1:28 p.m. This is the end of Media 12.
(Recess taken, 1:28 p.m. to 1:30 p.m. CDT)
THE VIDEOGRAPHER: We're back

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on the record at 1:30 p.m. This is the beginning of Media 13.
A. Here, I was looking to see if they have entered this measure as a continuous measure into the analysis, in which case they're looking at to see the different levels of severity; they would be able to examine that association with the outcomes. That was why I was looking at this.
BY MS. COATES:
Q. And did they do that?
A. It seems to me that they have actually analyzed it as continuous because they talk about linear regression.
Q. They only report as -- compulsive use as an outcome, correct?
A. A measure of compulsive use, but they have attempted to do some psychometrics for here to --
Q. This study explored the association with motivated -- of what motivated someone to use YouTube and what the authors identified as a compulsive use, correct?

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A. Yeah, it is compulsive use. That's what they mention.
Q. And the study also explored the association of different personality traits and what the authors identified as compulsive use, correct?
A. That is correct.
Q. And the study also explored the association of what the authors identified as compulsive use with academic motivation, correct?
A. That's another, that's correct.
Q. And the study did not explore any association of any mental health outcome and what the authors identified as compulsive use, correct?
A. I'm looking at to see if they have included any measures of mental health.
I don't see any measures of mental health, so that's correct.
Q. Okay. And lastly, you cite a series of studies for the proposition --
This is on page 68 of your report.
A. Yes.

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Q. That much of the past research on the mental health impact of YouTube exposure examined the impact of this app along with other short-form videos. And you cite three studies, Zhu 2024, Wu 2021 -- four studies, I'm sorry -- Yu -- oh, no, three -- and Yu et al 2024.

Did you do anything to verify that the study participants examined the impact of YouTube along with other -- the study authors examined the impact of YouTube along with other short-form video apps as part of these studies that you cited here?

MS. EMMEL: Objection, vague and compound.

A. Yeah, can you paraphrase what -- the question?

BY MS. COATES:

Q. Did any of these -- did you do anything to verify that these studies actually looked at the impact of YouTube along with other short-form video apps as part of these studies as you say in your report on page 68?

MS. EMMEL: Same objections.

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A. I believe they report short-term -- short-form video apps, and they include these four apps -- three apps, TikTok, Instagram and YouTube, in their studies.

Here I say that they look at the short-form video use, but I don't recall if I looked at each one of them to see what they had --

BY MS. COATES:

Q. Okay. I'm going to mark these and give them --

MS. EMMEL: Excuse me, you didn't let him finish his answer.

A. Yeah, I didn't look to see if -- verify, as you say, that each one of them have identified YouTube as one of those short-video apps.

MS. COATES: Okay. I'm very short on time, so I'm going to mark these as three exhibits, and I just have two questions.

So why don't we go off the record so you can look at these.

THE WITNESS: Sure.

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MS. COATES: And then once you're done with them, I'll finish my questions.

THE VIDEOGRAPHER: All right. We're off the record at 1:34 p.m. That's the end of Media 13.

(Recess taken, 1:34 p.m. to 1:39 p.m.)

(Whereupon, Mojtabai-50, The relationship between short-form video use and depression among Chinese adolescents: Examining the mediating roles of need gratification and short-form video addiction, by Zhu et al, was marked for identification.)

(Whereupon, Mojtabai-51, The Relationship Between Social Short-Form Videos and Youth's Well-Being: It Depends on Usage Types and Content Categories, by Wu et al, was marked for identification.)

(Whereupon, Mojtabai-52, The association between problematic short video use and suicidal ideation and self-injurious behaviors: The

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mediating roles of sleep disturbance and depression, by Yu et al, was marked for identification.)

THE VIDEOGRAPHER: We're back on the record at 1:39 p.m. This is the beginning of Media 14.

BY MS. COATES:

Q. Dr. Mojtabai, all of these studies on short-form video apps, the Zhu, Wu and Yu studies, were conducted in China, correct?

A. That is correct.

MS. EMMEL: Objection, compound.

BY MS. COATES:

Q. Do you know if YouTube is available in China?

A. That is a good question. I don't have the answer. I don't know the answer.

MS. COATES: Okay. Thank you very much. Those are all my questions for you today. Let's go off the record.

THE VIDEOGRAPHER: We're off

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record at 1:39 p.m. This is the end of Media 15.
(Recess taken, 1:39 p.m. to 1:47 p.m.)
(Whereupon, Mojtabai-53, "Oh Snap!": A Mixed-Methods Approach to Analyzing the Dark Side of Snapchat, by Dunn et al, was marked for identification.)
(Whereupon, Mojtabai-54, Digital stress within early adolescents' friendships - A focus group study from Belgium, by De Groote et al, was marked for identification.)
(Whereupon, Mojtabai-55, Duplicate of Exhibit 54, was marked for identification.)
(Whereupon, Mojtabai-56, Transforming Society and Organizations through Gamification, by Spanellis et al, was marked for identification.)
(Whereupon, Mojtabai-57, How It Feels to Be "Left on Read": Social Surveillance on Snapchat and Young Individuals' Mental Health, by

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Vanherle et al, was marked for identification.)
(Whereupon, Mojtabai-58, Snapchat Streaks - How are these forms of gamified interactions associated with problematic smartphone use and fear of missing out among early adolescents, by van Essen, was marked for identification.)
(Whereupon, Mojtabai-59, Snapchat Elicits More Jealousy than Facebook: A Comparison of Snapchat and Facebook Use, by Utz et al, was marked for identification.)
THE VIDEOGRAPHER: We're back on the record at 1:47 p.m. It's the beginning of Media 15.

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EXAMINATION

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BY MR. MAJOR:
Q. Good afternoon, Dr. Mojtabai. My name is John Major. I'm from Munger Tolles & Olson. I'm from Snap Inc., the maker of Snapchat. I have just a few

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questions for you.
A. Sure.
Q. Dr. Mojtabai, do you personally have a Snapchat account?
A. I don't.
Q. Have you ever used Snapchat?
A. I have not.
Q. In forming your opinions in this case about Snapchat, did you conduct any hands-on testing of the Snapchat app?
A. I have not, but I have seen YouTube videos of it and read about it.
Q. What did you do to learn about how Snapchat works in connection with providing your opinions in this case?
A. As I said, I looked at YouTube videos on how Snapchat works and I have read the literature, including those that are here.
Q. Anything else?
A. I can't think of anything else that -- that's about it.
Q. About how long did you spend watching YouTube videos of Snapchat?
A. I really can't put a time on

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it. Not very long.
Q. Under ten minutes?
A. No, no, it was more than that.
Q. Under an hour?
A. I would say an hour or so.
Q. Okay.
A. Or maybe a little bit more, because there are different videos you can find on YouTube.
Q. Sure.
When a user opens Snapchat on their phone, what part of the app do they initially see?
A. I'm not sure.
Q. And could you explain to me at a high level the different tabs or sections of the Snapchat app?
A. From what I have seen on YouTube, I think there is a My section or what is called My Page or something that's specific to the user. And then there are other feeds.
Q. Do you know how much time Snapchat users, on average, spend using different features of the Snapchat app?

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A. I don't know the time.
Q. Did you ask for that information in connection with presenting your opinions?
A. I did not ask for that information, nor did I see any literature specifically separating different uses.
Q. Do you know how much time Snapchat users spend messaging with friends versus engaging with other parts of the Snapchat platform?
A. I do not because that's a use -- I didn't specifically look for this breakdown. I don't know if the company probably has it or provides information on that, but I haven't seen that.
Q. What percentage of your annual income in 2024 came from expert witness work?
A. I'm going to give you an estimate because I'm not sure exactly. But it should be about 10 to 15%.
Q. And then what percentage of your income so far this year has come from expert witness work?
A. Well, I have submitted one --

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my last invoice, and I haven't received any payment for that. I would say around 8, 7% or so.
Q. Are you affiliated with any organizations or firms that try to find you other expert witness work?
A. Any firms that find expert witness? No, I'm not familiar with them.
Q. There are firms that sort of you'll affiliate with and then they'll try to help you find assignments as an expert.
Are you affiliated with any of those?
A. I'm not familiar even with firms like that.
Q. One of your opinions in this case is that problematic social media use and social media addiction are substantial contributing causes of adverse mental health outcomes.
Is that a fair high-level overview of one of your opinions?
A. That is fair representation, yes.
Q. Have you reached out to any

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public health authorities to alert them to that opinion?
A. I think there are plenty of advisories and warnings or messages from public health agencies, including Surgeon General, American Psychological Association regarding this.
MR. MAJOR: Move to strike as nonresponsive.
BY MR. MAJOR:
Q. I'm asking you a slightly different question, which is: Have you personally reached out to any public health authorities to alert them to the opinions you've reached in this case?
MS. EMMEL: Asked and answered.
A. No.
BY MR. MAJOR:
Q. Have you reached out to any media organization to alert them to the opinions you've reached in this case?
A. I don't think it's appropriate, since I'm engaged in a legal case, to reach out to media or public outlets. I considered that not something that I should be even

Page 631

doing.
Q. So the answer is no?
A. No.
Q. Have you recommended that any of your patients bring a lawsuit alleging they were harmed as a result of using social media?
A. No.
Q. You didn't recommend that any particular plaintiff in this lawsuit should bring claims relating to their use of social media; is that fair?
A. I don't know of any of the plaintiffs, and as such, no.
Q. In the course of your career, have you become familiar with Surgeon General reports?
A. Yes.
Q. You don't rely on Surgeon General reports in the course of your everyday psychiatry practice, do you?
A. I don't rely on them, but I look at them and read them. They provide overviews of concerns that are public health concerns for the population, so yes.

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Q. And we touched on this briefly a moment ago. You didn't review any materials relating to the specific plaintiffs in this litigation, correct?
A. No. That's correct, yes.
Q. You never examined or treated any of the individual plaintiffs in this litigation?
A. No, I didn't.
Q. Your opinions aren't based in any way on any specific information relating to the individual plaintiffs in this case; is that fair?
A. No, I don't know any of the -- or I'm not privy to any of the information.
Q. You would agree with me, I think, that social media can serve positive functions in certain circumstances, such as staying connected with friends and family; is that fair?
A. In certain circumstances, yes, and in certain people, groups of people, yes.
Q. And you believe that in moderation and with guidance, social media can be a healthy part of adolescent

Page 633

development; is that fair?
MS. EMMEL: Objection, vague and ambiguous.
A. Again, for the proportion of adolescents, I believe that is the case.
BY MR. MAJOR:
Q. You don't believe social media should be banned entirely, do you?
A. Oh, I don't think it's even possible.
Q. But you don't believe social media should be banned entirely?
A. No, I don't believe that.
Q. So, Dr. Mojtabai, in your report you discuss certain research studies that focus specifically on individual social media platforms; is that right?
A. Yeah.
Q. And as YouTube's counsel asked you, you discussed those platform-specific studies in Section 6 of your report that starts on page 55 of Exhibit 5, correct?
A. That's correct.
Q. And if you could turn in your report to Section 6.11, which is titled "The

Page 634

'dark side' of Snapchat."
A. Yes.
Q. That's a section where you specifically talk about Snapchat, right?
A. That is correct.
Q. And that section includes all of the Snapchat-specific studies that you relied on in forming your opinions, correct?
MS. EMMEL: Objection, vague.
A. Yeah, the studies that I reviewed and I thought were relevant, I included here.
BY MR. MAJOR:
Q. Okay. So the only studies that you relied on that focused specifically on Snapchat that you decided were relevant are the ones discussed in Section 6.11 of your report; is that true?
MS. EMMEL: Objection, vague, misstates testimony.
A. As I mentioned, I have considered a lot of studies. I've looked at different -- considered also a lot of other material, including company documents. But I relied on these studies for writing this

Page 635

section.
BY MR. MAJOR:
Q. So the only Snapchat-specific studies that you cite and discuss in your report are in Section 6.11 of the report; is that fair?
MS. EMMEL: Objection, misstates testimony.
A. There might be other sections where I talk about specific features of Snapchat or studies that included or mentioned specifically that we looked at Snapchat.
BY MR. MAJOR:
Q. Sure.
A. But I'm not right now -- I don't know where they would be in this report.
Q. So the Snapchat-specific studies that you're aware of as you sit here today would be discussed in Section 6.11?
A. I would think so, yes. Yes. There might be, as I said, other studies that include Snapchat or refer to it, and they're in other parts of the report.

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Q. That's fair.
But the ones that are specific to Snapchat would be discussed here?
A. That's correct.
Q. And we've marked the studies that are discussed in that section of the report as Exhibits 53 through Exhibit 59. I'd note that the De Groote study was marked twice as Exhibit 54 and Exhibit 55.
A. Yes.
Q. You had an opportunity to review those briefly off the record.
Would you agree with me all of those studies are either qualitative focus group studies or cross-sectional studies?
A. I would say that most of them were cross-sectional studies, and a few -- just one of them maybe was focus group and another one was a qualitative. So most were quantitative studies.
Q. And as we've talked about, cross-sectional studies generally can't establish directionality or causation, correct?
A. They can support it, but they

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cannot establish, generally.
Q. And studies involving focus group interviews like the studies in this group also cannot establish directionality or causation; is that fair?
A. I don't think that focus groups are exploring directionality or causation specifically. They provide information that can be used in future studies, support what you find in other studies, like in these studies, one of them is a mixed method, or illuminate what you have found in a quantitative study. They can be very helpful, and they're essential in the research.
Q. Thank you, that's helpful.
So none of the six studies that we've had marked that are discussed in Section 6.11 are able to establish directionality or causation in terms of Snapchat potentially causing mental health harms.
Is that a fair statement about those studies?
MS. EMMEL: Objection, vague,

Page 638

compound.
A. So they do provide -- specifically, studies that look at the features of Snapchat, like Snap Map or Streaks, they do provide evidence that is beyond just a cross-sectional study because they highlight a mechanism -- a potential mechanism of harm.
So that is going with what Bradford Hill would say is specificity. The specificity is you identify two variables that are related, but you identify, for example, a mechanism or a subgroup of people who are specifically affected by that -- by that cause, causal factor.
And some of the studies do provide information like that about specific features of Snapchat.
MR. MAJOR: I'll move to strike as nonresponsive.
BY MR. MAJOR:
Q. My question is a little bit different, which is: I understand they may establish a mechanism, but these studies that we're talking about here don't establish

Page 639

directionality or causation on their own. They may establish the mechanism, but they don't establish causation, fair?
MS. EMMEL: Objection, vague, compound.
A. The mechanism is part of the causation. When we look at causation, we see the two variables are related, first of all. Then we look at the other elements that help us establish a causal relationship.
As I mentioned, Bradford Hill has a set of criteria or guidelines, really. There are other guidelines as well.
But this is one of -- one of the guidelines.
But mechanisms provide specifically how variable A is related to variable B, and sometimes mechanisms make it more plausible that the cause of direction is going from one to the other.
So not all cross-sectional studies are the same. Some of them establish mechanisms and they provide more causal information.
Do they establish causal --

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causation? I don't think one study can ever establish beyond a doubt or be definitive proof of causality. It's the aggregate.
BY MR. MAJOR:
Q. Let's actually talk about some of the specific studies. So I'd ask you to get Exhibit 53 in front of you.
A. Right.
Q. It's the Dunn and Langlais study.
A. Uh-huh.
Q. So this is a 2021 article by Dunn and Langlais. It's titled A Mixed-Methods Approach to Analyzing the Dark Side of Snapchat.
Do you see that?
A. Yes, I do.
Q. And it involved a qualitative and quantitative analysis of the dark side of Snapchat, right?
A. Yes, it is.
Q. And then I'd ask you to look at page 97 of the study, hence the heading of Limitations.
A. 97, yes.

Page 641

Q. And a few lines down, fourth line down, it says: Second, a one-time online survey, while informative, is limited.
Do you see that?
A. Yes.
Q. And then if you turn back to page 83, the authors write, third line towards the end --
A. 83, I'm sorry.
Q. Yeah, go ahead.
A. Okay.
Q. From the regression results, it appears that spending time on Snapchat is related to lower levels of mental health, regardless of age, gender, ethnicity, and sexual orientation. It could also be that individuals with lower levels of mental health spend more time on Snapchat.
Do you see that?
A. That is -- I do see that.
Q. So what the authors are saying there is based on the study design, they couldn't tell whether more time on Snapchat caused lower levels of mental health or whether individuals with preexisting lower

Page 642

levels of mental health spent more time on Snapchat; is that fair?
MS. EMMEL: Objection, compound.
A. Here they're talking about the amount of time on Snapchat. They're not talking about specific mechanisms.
BY MR. MAJOR:
Q. Correct. And they're saying they couldn't tell whether individuals that spent more time had lower -- caused lower levels of mental health or individuals with lower levels of mental health spent more time. They couldn't tell directionality, correct?
A. That is what they are saying, yes.
Q. Let's turn to De Groote. That's Exhibit 54 and Exhibit 55, but we'll just use 54.
A. Okay.
Q. Looking at page 1 in the abstract, this study involved 51 secondary school students in the Dutch-speaking community in Belgium; is that right?

Page 643

A. That's correct.
Q. And if you go to page 9, under Limitations.
A. Yes.
Q. The authors -- the authors write, the fourth line: Second, our participants were recruited in two high schools in Flanders, Belgium. Therefore, the results of the study are not generalizable to the entire population of youth.
Do you see that?
A. I see that.
Q. Any reason to disagree with that statement?
A. I think it could be qualified more, or looking at it, we could identify whether recruitment from these schools was, like, in a random manner so that the samples are representative of those schools or not.
Because if they are, then one could argue that they may be generalizable to students in schools.
Q. And I'll back you up just one sentence in Section 6, the second line there. It says: First, we conducted our study among

Page 644

a convenience sample of adolescents who self-selected to participate in this study on social media.

Do you see that?

A. Yeah.

Q. You'd agree that's not a randomized sample, right?

A. As in focus groups, that is not a randomized sample, no.

Q. And so you'd agree that the results of this study are not generalizable, correct?

A. Focus groups are not producing generalizable results in general and typically. So as much, I agree with you.

Q. Thank you.

Let's go to Exhibit 56. It should be the book chapter by Hristova and Lieberoth that you cite in Section 6.11 of your report.

A. I think I lost that one.

Q. This is the cover, if it helps.

A. Let me see. Oh, yeah.

Q. So this is more of a conceptual theoretical analysis rather than an empirical

Page 645

study, right?

A. That's correct.

Q. There's no data sample or participant sample or statistical analysis, correct?

A. That is correct, but they do review features, like gamification of social media and studies that have looked at that.

Q. Yes. And nowhere in this chapter, at least, do the authors claim that features like Snapchat Streaks caused depression or anxiety or addiction or any other mental health disorder, correct?

MS. EMMEL: Objection, compound.

A. I'm looking at the place where they talk about Streaks. Quick look.

(Document review.)

A. So here: However, psychological research -- they talk about a Meshi article on page 231 -- psychological research has hinted that, through their daily iterative reward structure, Streaks reinforce repeated and potentially problematic use of the platform.

Page 646

Indeed -- it goes on: Indeed, research among Viennese adolescents reveals that keeping a Streak alive may be perceived as stressful -- and they refer to Hristova, I think it's in my pile of studies, Salomon and Hristova.

So that is --

BY MR. MAJOR:

Q. And let me --

MS. EMMEL: He wasn't finished.

A. Yeah, that is -- what I was going to suggest is that they talk about what they know or the literature that they know about mental health outcomes associated with -- with some specific features of Snapchat.

BY MR. MAJOR:

Q. That's helpful.

And let me just go back to my question, narrow it a little bit.

Nowhere in the chapter do the authors claim that features like Snapchat Streaks caused mental disorders; is that fair?

A. Again, I don't see anywhere

Page 647

where they make that statement.

Q. Let's go to Exhibit 57.

A. Yes.

Q. This is a Vanherle study titled How it Feels to be "Left on Read."

Do you see that?

A. On read, yes.

Q. Let's turn to page 12. It's actually -- it's not numbered, but it's towards the end of the substance. I'm going to the Limitations section.

A. Limitations, yes.

Q. And under Limitations, it says: First, this study used a snowball sampling approach to recruit participants, and although this approach eases the sampling process, it remains impossible to determine sampling errors and generalize the results across a population.

Do you see that?

A. I see.

Q. Any reason to disagree with that statement?

A. I just want to say that snowball sampling is a recognized method for

Page 648

sampling, especially for hard-to-sample populations.
Q. Understood.
But going back to my question: Any reason to disagree with this statement that, at least here in this study, the snowball sampling approach made it impossible to determine sampling errors and generalize the results across a population?
A. Again, they could have looked at the generalizability or whether it's a representative sample -- is an empirical question. So you could also look at the population of students in that sampling frame to see if they are similar to those who are sampled or not.
So it doesn't necessarily make it impossible. They were not able to do that.
Q. Understood.
So in this study, they were not able to do that?
A. Yeah.
Q. And then in the second paragraph here towards the middle, there's a

Page 649

sentence that reads: Moreover, given that ESM, experience sampling methods, consist of multiple assessments per day, it would be possible to specify the directions of the tested associations and prove causality, which was impossible in our cross-sectional design.
Do you see that?
A. Proving causality, I agree with that statement. It is not possible to do it in one study even if it doesn't have limitations that they mention.
Q. Okay. Let's go to Exhibit 58. This is an article by Christina M. van Essen and Joris Van Ouytsel titled "Snapchat streaks - How are these forms of gamified interactions associated with problematic smartphone use and fear of missing out among early adolescents?"
Do you have that in front of you?
A. Yes.
Q. Are you familiar with the authors here?
A. Van Essen and Ouytsel, no, I'm

Page 650

not.
Q. But you did choose to cite this in your report; is that fair?
A. Yeah, it is -- it is referenced.
Q. Anything in the study that you disagree with that you know of?
(Sotto voce document review.)
A. I do not disagree with anything that is stated here in the -- at least in what I read right now.
BY MR. MAJOR:
Q. Okay. But --
A. But I want to make this point that this is actually one of those studies that has looked at the specific features. So it goes beyond just the cross-sectional study.
Q. Sure.
Let's go to page 4 towards the bottom of the right-hand column.
A. Yes.
Q. And there the authors write: The engagement in Snapchat streaks might, in fact, be part of a normative communication

Page 651

process of the adolescent population -- it continues on to page 5 -- not necessarily driven, in strong degrees, by FOMO, problematic smartphone use, and social media self-control. Our study does contribute to the cumulative evidence that these novel forms of interpersonal communication do not necessarily have to be understood from a risk perspective and that the public concern about these gamified forms of interpersonal communication may be overstated.
Do you see that?
A. I see that.
Q. Any reason to disagree with that statement?
A. I believe, going back to what they found, I'm going to read. They say problematic smartphone use was associated with the engagement in Snapchat Streaks. Lastly, FOMO, problematic smartphone use and social media self-control were correlated with the number of people and the number of days adolescents maintained Snapchat Streaks with, albeit being a weak relationship.
So that found some things, some

Page 652

associations specifically with the Streaks, and although Streaks might be beneficial for some adolescents, I think the likelihood of harm is found in their study. I don't know what they would say, it's just a part of normal development.

Q. I understand.

So they conducted the study, they saw their data, and then they wrote that their study contributes to the cumulative evidence that novel forms of interpersonal communication do not necessarily have to be understood from a risk perspective, and the public concern about these gamified forms of interpersonal communication may be overstated.

That's what they said, right?

A. What I'm saying is that their findings are not consistent with their overall conclusions.

Q. So you disagree with the authors' interpretation of their own data; is that fair?

A. I do.

Q. Let's go to Exhibit 59. This

Page 653

is the Utz study.

MS. EMMEL: I don't believe I have that one.

MR. MAJOR: Oh, I'm sorry. There you go.

MS. EMMEL: Thank you.

BY MR. MAJOR:

Q. This is a 2015 study that compares Snapchat and Facebook in terms of romantic jealousy; is that right?

A. It is.

Q. It involved, if you look at page 143 under Method and Participants, 77 participants, mostly from Europe; is that right?

A. I'm looking at the participants, was -- yes.

Q. Average age, 22 years old?

A. Yes.

Q. That sort of sample is not representative of adolescents in general or adolescents in the US; is that fair?

A. It is more representative of emerging adults or young adults, as you say.

Q. And you can take a moment to

Page 654

look at it if you need to. If we need to go off the record, we can. But nowhere in this paper do the authors suggest that Snapchat use leads to anxiety, depression or any other diagnosable psychological condition; is that fair?

MS. EMMEL: And for the record, we don't need to go off the record. He takes very little time to review these things. I understand time is running short, but he can review on the record.

THE WITNESS: I'm sorry, can you repeat your question?

BY MR. MAJOR:

Q. Nowhere in this paper do the authors suggest that Snapchat use leads to anxiety, depression or any other diagnosable mental disorder, correct?

(Document review.)

A. The outcome they were examining was jealousy, was not mental health.

BY MR. MAJOR:

Q. So the answer to my question -- let me just ask the question again.

Page 655

Nowhere in this paper do the authors suggest that Snapchat use leads to anxiety, depression or any other diagnosable mental disorder; is that right?

MS. EMMEL: Asked and answered.

A. As I said, this is a study of jealousy, and as such, it does not assess depression, anxiety or other mental health outcomes.

MR. MAJOR: Go off the record.

THE VIDEOGRAPHER: We're off the record at 2:17 p.m. That's the end of Media 15.

(Recess taken, 2:17 p.m. to 2:21 p.m. CDT)

THE VIDEOGRAPHER: We're back on the record at 2:22 p.m., this is the beginning of Media 16.

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EXAMINATION

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BY MS. CHARLES:

Q. Dr. Mojtabai, my name is Amber Charles. I represent Meta Platforms, and I want to thank you for your time. I know it's

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been a long day and we appreciate the patience, and I'll try to be as quick as possible.

I know when we were off the record you pulled out Exhibit 30. Could you take a look at that?

A. Yes.

Q. Exhibit 30 is your materials considered list?

A. Yes.

Q. Okay. And this is the most recent version that your counsel shared with us last night?

A. If so, that is the most recent.

Q. Okay. I'll trust your counsel's representation on that. I think that's what we marked it as.

Could you turn to entry number 983. I don't believe the document has page numbers, but those numbers help.

A. 83. Yes.

Q. Okay. You see entry 983?

A. Yes.

Q. It's identified as a Meta-produced document?

Page 657

A. It states so.

Q. Okay. And if you flip through, you've got about 14 pages to flip through, can you flip through to entry 1630?

A. 1630, yes.

Q. Do you have that in front of you?

A. Yes.

Q. That's another Meta-produced document?

A. Yes.

Q. That's the last document on your list that's identified as a Meta-produced document?

A. Yes. After that it goes to MT-IG, which I don't know if it is also Meta or not.

Q. Okay. So if I've done my math right, that's 648 documents between 1630 and 983?

A. 983 and 16 -- yes.

Q. How many of those 650 documents produced by Meta have you read?

A. I should say many of them are brief e-mails. I may have just looked at

Page 658

them and, you know, because I didn't pay much attention to e-mails or internal documents. I didn't look at them.

So the ones that included data or a survey or a survey result, I read, but not -- I didn't read everything.

Q. Okay. So you actually cite in your report approximately 20 Meta documents.

Did you -- after reviewing, did you identify the other 630 were not relevant to your analysis?

A. As I said, I mean, reviewing is a broad term. I skimmed a lot of them, just opened it. Some of them are repetitive or responses to previous e-mails or -- I don't know if they're e-mails. They're internal communications, if that's called -- qualifies as an e-mail.

But I just didn't read much of those.

Q. Okay. So you looked at them, determined they weren't relevant and moved on?

A. Yeah.

MS. EMMEL: Objection,

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mischaracterizes testimony.

BY MS. CHARLES:

Q. How did you identify the 650 documents you've included on your materials considered list?

A. They were provided to me. You mean I -- I'm not sure I understand, how do I identify them?

Q. Sure.

Did you select the documents to review yourself?

A. Yeah, I mean, they were provided to me. Like, the Haugen ones, for example, by the counsel, and I looked at them.

Q. Okay. Did you give counsel any criteria for how they should select the documents they chose to provide to you?

A. No. No, I didn't. No.

Q. Of all of the Meta-produced documents you reviewed, were any of them longitudinal studies?

A. I have to think about that. I don't believe I saw a longitudinal study that -- and I don't -- if I had come across

Page 660

it, I would have referred to it in my reports.
Q. You also reviewed some internal documents from the other defendants, Snap, TikTok and YouTube, correct?
A. I think I was -- at the time, I was -- and I'm looking at this. This is mostly almost 1634, so it's all Meta.
Q. Okay.
A. You see there's not other -- many others.
Q. Okay. I can maybe shortcut this.
To the extent you reviewed other defendants' documents, did you identify any longitudinal studies within the documents you reviewed?
A. I don't recall.
Q. Okay. Your materials considered list also includes some depositions of current and former Meta employees?
A. Yes.
Q. Okay. Were those depositions selected for you by counsel or did you select

Page 661

which depositions to read?
A. I didn't have any selection on --
Q. Okay. Counsel gave you the depositions that you read?
A. Yeah, yeah. I didn't know beforehand whose deposition I was going to see, so not --
Q. Did you give counsel any criteria for which types of depositions you'd like to read?
A. No.
Q. Okay. Do you believe it would have been relevant to review the deposition of Instagram's head of research?
A. That was whose? I mean, I forgot. I looked at the number of the depositions. Can you provide the name to this?
Q. Kristin Hendrix, it's not on your list.
A. So it's in here?
Q. No, my question is a little bit different.
Do you believe that reviewing

Page 662

the deposition of Instagram's head of research would have been relevant to your work here, the opinions you're offering?
A. Depends on what was in the deposition, because she talked about studies that were done internally, reported on the outcomes of those studies that were not included in what I had seen before.
Q. Sure.
And you don't know what was in her deposition because it wasn't one of the depositions your counsel provided you?
A. No. That is correct.
Q. Okay. Yesterday you were asked when it would be appropriate to rely on deposition testimony or internal e-mails, and you gave the example of some former colleagues at Johns Hopkins who considered those materials in the context of the opioid epidemic.
Do you recall that example?
A. Yeah, I do.
Q. Okay. Your colleagues at Johns Hopkins were giving -- the opinions they gave about the opioid epidemic, they were giving

Page 663

those in the context of litigation, correct?
A. I don't know --
Q. You don't know?
A. -- about those documents. And they're available online, I think, now. We could go online. And they were using those depositions for research. I think -- I believe it's research nowadays.
Q. You don't know if they were paid experts in the City of Baltimore's opioid litigation?
A. I have no idea.
Q. Okay. If you look at Exhibit 5, and you can turn to page 47. You have a section in your report, which is Exhibit 5 in front of you, that discusses a handful of internal studies conducted by researchers at Instagram, correct?
A. Okay. Yes.
Q. Okay. And these are studies that were selected for your review by counsel?
A. The studies were not selected for me. They provided all this material, and when I was going through them, I was trying

Page 664

to identify studies that would be relevant, internal studies that would be relevant to the topic that I'm writing the report on. So I noted that they were relevant.

Q. So they came from the larger set of 650 documents?

A. Correct.

Q. Okay. I'm going to hand you what's been marked as Exhibit 16.

(Interruption by the stenographer.)

MS. CHARLES: I'm sorry, 60, thank you.

(Whereupon, Mojtabai-60, Presentation Hard Life Moments - Mental Health Deep Dive, META3047MDL-033-00095008 - META3047MDL-033-00095034, was marked for identification.)

BY MS. CHARLES:

Q. Doctor, do you recognize Exhibit 60 as one of the internal studies you referenced?

A. It looks very familiar, yes. I've noticed also some of these reports are,

Page 665

like, newer editions or newer versions of what was previously presented, so I'm not sure if that is the version that I looked at.

Q. Okay. This is a PowerPoint deck, correct?

A. Correct.

Q. It's not a peer-reviewed study?

A. That is my understanding. I don't know if it has been published or not. I haven't seen it.

Q. And understanding you're not a lawyer, do you know what a Bates number is?

A. The --

Q. Do you see these long numbers in the bottom right-hand corner?

A. I thought that they were just to identify where they are in the deck.

Q. Correct. I was just going to do exactly that.

I was going to ask you to turn to the Bates number that ends in 5011 in Exhibit 60 in front of you. Oh, no, I'm sorry, sir. On Exhibit 60.

A. Okay.

Q. Do you see at the bottom

Page 666

right-hand corner there's a long number?

A. Yes. Yes.

Q. Can you turn to slide 4. It's the page that ends in 5011.

A. Yes.

Q. Okay. This slide discusses the design of Instagram's internal study?

A. Yes.

Q. More than 22,000 users were surveyed in this study?

A. Yes.

Q. There's no information provided about how those 22,000 users were selected?

A. I don't see it here. Maybe in the prior sections they have described it, but I don't see it here.

Q. Okay. You don't know if they were randomly chosen?

A. I have no idea about -- based on what I have in my hand.

There probably is the description in this 1600 documents that are in this pile, but off the top of my head, I don't.

Q. You don't know how old the

Page 667

respondents were?

A. They say ages 13 to 65-plus.

Q. Okay. You don't know the gender breakdown?

A. They do not mention that here. I don't see.

(Document review.)

A. I don't see it here.

BY MS. CHARLES:

Q. All right. And you don't know any participants' mental health history or diagnoses?

A. No.

Q. Okay. This study relies on self-report data; is that fair?

A. I believe it does, yes.

Q. And if you look at page 48 of your report --

A. Right.

Q. -- you have a statement. It's in the second-to-last paragraph on page 48.

A. Yes.

Q. You -- in discussing the study, you acknowledge that it relies on self-report data and that it measures individuals who had

Page 668

these experiences, not whether Instagram caused these experiences.

And then you write: These criticisms are beside the point. Most research and behavioral health is based on self-reporting by individuals on their experiences. Most of the diagnostic categories in the DSM-5 are based on experiences of symptoms.

Do you see that language?

A. Yes.

Q. Okay. In a clinical setting, a person reports their symptoms to a trained psychiatrist like you?

A. Correct.

Q. As the psychiatrist, you have the ability to evaluate their self-report?

A. Evaluate means get more information.

Q. Uh-huh.

A. You don't have -- they can deny their experiences. They'll say -- if the person says, I have been feeling depressed all day most days the past two weeks, we do not, you know, say, no, you don't --

Page 669

Q. Sure.

A. -- or I don't believe that you do.

Q. Fair enough. But you get to ask follow-up questions?

A. Yes.

Q. You get to explore the duration?

A. Yes.

Q. You get to explore the severity?

A. Yes.

Q. You get to explore other life events that may be occurring at the time?

A. We do.

Q. And then you get to make a diagnosis?

A. That is correct.

Q. Individuals do not -- cannot give themselves a diagnosis based on the DSM-5?

A. That is correct.

Q. Okay. You are not opining that this study is able to show a causal relationship between Instagram use and mental

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health outcomes, correct?

A. What I was saying, that the objection of this study being based on self-report is besides the point because in psychological research, in epidemiological research, we rely on self-report.

Q. I understand. So my question is different.

Are you using the study, in your opinion, to -- to opine that there is a causal relationship between Instagram use and mental health outcomes?

A. I'm not using it. I'm considering it. My argument is based on published peer-reviewed research.

Q. Let's stick with Exhibit 5. Can you look at page 49 of your report?

A. Exhibit 5. Yes.

Q. Okay. On page 49, you discuss internal documents related to social comparison and body image dissatisfaction?

A. Correct.

Q. Okay. And you refer to augmented reality filters or beauty filters?

A. Yes.

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Q. Okay. Do you see that there's a block quote about halfway down the page, page 49?

A. Yes.

Q. And that is -- you chose to insert this block quote in your report. It's from a literature review, correct?

That's how you describe it?

A. I'm looking at it.

Q. Sure.

A. Deposition -- no, it's actually based on Dr. -- I believe Dr. Stewart's testimony. Oh, and the -- I'm sorry, yes, yes.

It's referring to a number of articles there.

Q. Okay. And this literature review cites two studies, Thompson and Grabe?

A. Yes.

Q. Okay. You've reviewed both of those studies?

A. I'm sorry, which one is your -- Thompson and -- oh, yes, down there.

No, I'm just quoting what was in the deposition --

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Q. Sure.
A. -- in that report.
Q. Both Thompson and Grabe appear on your materials considered list, but I'll move on.
To your knowledge, neither of the studies cited there discuss any Instagram photo filters or other Instagram effects, correct?
A. As I said, I may have looked at them, but I haven't considered them in the context of your question. If you want, I can look at them.
Q. Unfortunately, I'm a little short on time.
A. Understood.
Q. But I'll try to simplify this.
Thompson was published in 1999. Do you see that there?
A. Yes.
Q. And Grabe was published in 2008.
Do you see that there?
A. Yes, they are -- predate Instagram.

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Q. Okay.
MS. CHARLES: Can I get a time check?
THE STENOGRAPHER: 15 minutes.
BY MS. CHARLES:
Q. Dr. Mojtabai, in your clinical practice, have you ever told a patient to stop using social media in order to address a diagnosed mental health harm?
A. I haven't said to stop, but to make it -- you know, use it more in moderation. There have been patients that I have advised them to limit it or use it in moderation.
Q. How many patients?
A. This is hard for me to remember. I mean, if patients complained about it and had problems with managing their social media use, I would have suggested to them.
Q. Okay.
A. Maybe two patients. We were talking about it yesterday. I do recall two patients with problematic use of social media, and I probably advised them to

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moderate.
Q. So if a patient came to you and self-reported problematic use, you might advise them to reduce their social media use?
A. If it's a problem that they're bringing up and I feel that it is contributing to their mental health problems, I would.
Q. Okay. And you have given that advice maybe up to two times?
A. Maybe, yeah.
Q. Okay. Do you have an Instagram account?
A. No.
Q. Okay. Have you ever used Instagram?
A. I have been sent links to Instagram by, you know, other apps.
Q. Okay. Did you open those links?
A. I have, but sometimes they say we can't get in because you don't have an account.
Q. In relation to this case, did you conduct any testing of Instagram?

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A. I did not, but I looked at videos, YouTube videos, similar to the Snapchat chat, to get a familiarity, at least a little -- become a little bit familiar with the --
Q. I think you said you looked at about ten minutes of videos on Snapchat. Is that about the same --
A. No, more than that.
Q. More than that?
A. More than an hour both for Snapchat and also for Instagram.
Q. Okay. So an hour -- you looked at videos for approximately an hour?
A. I thought so. I mean, they were on YouTube, so some of them you have to look at a number of them to see like one hour of video.
Q. Do you have a TikTok account?
A. I don't.
Q. Have you ever used TikTok?
A. I have never used TikTok.
Q. Have you conducted any testing of TikTok in relation to this litigation?
A. Again, I have done -- just

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familiarized myself to know what I'm writing about. I have looked at YouTube videos about TikTok and read about it.

MS. CHARLES: Let's go off the record.

THE VIDEOGRAPHER: We're off the record at 2:40 p.m. That's the end of Media 16.

(Recess taken, 2:40 p.m. to 2:50 p.m. CDT)

THE VIDEOGRAPHER: We're back on the record at 2:50 p.m. This is the beginning of Media 17.

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EXAMINATION

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BY MR. DAVIS:

Q. Dr. Mojtabai, it's Todd Davis again representing TikTok. I just have a handful of questions left, all right?

A. Okay.

Q. In your expert reports, you claim that there's a rise in the prevalence of mental health problems in children and adolescents, correct?

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A. That is correct.

Q. And do you claim that there's a causal link between that increase in the prevalence of depression or mental health problems in children and adolescents that's the result of social media?

A. Among different potential possible candidate factors that may have contributed to this rise, I think social media is the most plausible.

Q. Okay. And in terms of the percentage of the increase that you attribute to social media versus all the other potential causes, have you done any type of breakdown to determine the percentage of which potential cause is contributing to the increase?

A. Well, my 2024 paper, I put in, in the analysis, the social media use and problematic use, and it explained the rise in that survey at least.

To the extent that that survey is representative of the population, I would say that it's an at least sizable proportion of the -- of the variance is due to social

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media.

Q. Can you put a percentage on it?

MS. EMMEL: Objection, vague.

A. I can't put a percentage on it, no.

BY MR. DAVIS:

Q. Okay. Here, let me hand you what's been marked as Exhibit 61.

(Whereupon, Mojtabai-61, An integrative literature review of birth cohort and time period trends in adolescent depression in the United States, by Askari et al, was marked for identification.)

BY MR. DAVIS:

Q. This is the Askari 2023 paper that you just discussed, right?

A. Yes. Yeah, it is.

Q. And, in fact, this Askari paper has the very same graphic in it that is in your expert report, correct?

A. Yeah, I've taken it from that paper.

Q. Right.

Now, you agree that an expert

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shouldn't give contradictory sworn testimony in different cases, right?

A. That is correct.

Q. Yeah.

A. Unless their view changes. I mean...

Q. You've given sworn testimony in a TikTok case where you were retained by plaintiffs' lawyers where you said it was unknown, what the cause of the increase in mental health problems, correct?

MS. EMMEL: Objection, misstates testimony.

THE WITNESS: First of all, do you have that testimony?

BY MR. DAVIS:

Q. I'm just asking you --

MS. EMMEL: Foundation.

MR. DAVIS: Just a minute.

BY MR. DAVIS:

Q. I'm asking if you've given that sworn testimony.

A. I don't recall giving testimony that it is unknown.

Q. Let me hand you what's been

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marked as your affidavit in the Canadian TikTok litigation.

(Whereupon, Mojtabai-62, 5/7/24 Affidavit of Dr. Ramin Mojtabai, Peters v. ByteDance, was marked for identification.)

A. Sure.

BY MR. DAVIS:

Q. You see that this is an affidavit that you swore under oath on May 7th, 2024, correct? Yes?

A. Yes.

Q. And you were swearing in this affidavit that the information that was contained in your expert report in the Canadian litigation was true and accurate, correct?

A. That is true, yes.

Q. Right?

And if you look at page 49, you discuss: The rise and prevalence of depression and depressive symptoms in children and adolescents in the US and other industrialized countries in the past decade is well documented.

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Do you see that?

A. That is true, yeah.

Q. And you say -- and I'm quoting you: While the reasons for these trends are not known, the parallels between these time trends and the trends in spread of social media use are highly suggestive of a causal link.

Correct?

A. That is correct.

Q. So under sworn testimony in Canada, you said that the -- that the actual cause of the rise was unknown, true?

A. I have said the rest of it too --

Q. You said it was -- you said it was unknown, correct?

A. Yeah.

Q. Yes?

A. I have said the whole paragraph. You're just taking one part of it and -- out of the context of the whole statement.

Q. Let's read the whole statement, then.

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A. Okay.

Q. You said: While the reasons for these trends are not known, the parallels between these time trends and the trends in spread of social media use are highly suggestive of a causal link.

Correct?

A. That's true.

Q. You did not say that there was an established causal link in your affidavit that you submitted in Canada, did you?

A. That is correct.

Q. Okay. Now --

A. And I did not say that it is an established causal link here also.

Q. Now, in your -- in your article, the Askari article, you actually identify ten articles that offered possible explanations for the increase in adolescent mental health outcomes, right?

A. That's correct.

Q. Six of the papers proposed social media might be a possible explanation, right?

A. Yes.

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Q. And there were at least four other papers that looked at other possible or potential explanations, which were economics, the opioid epidemic, and the rise in parental supervision, correct?

A. That's correct.

Q. And each of those remains a likely explain for -- as to contributing to the rise in youth and adolescent mental health problems that has been seen over the last decade and a half, right?

MS. EMMEL: Objection, vague and compound.

A. So, first of all, I should say about the 2022 affidavit, they're, like, three years since then. I have published on it. Others have published on these trends. And so --

BY MR. DAVIS:

Q. Yeah. Dr. Mojtabai --

A. Yes.

Q. -- it's a May 2024 affidavit, right?

A. Which one is that, you're talking?

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Q. Right? That's a May 2024. You signed it on May 2024.
A. In any case --
Q. Let's just stick with the question.
You signed that affidavit on May of 2024, right?
A. Okay. But the --
Q. Just a minute.
A. Okay.
Q. You agree with me, yes?
A. Yes, it is -- it says that.
Q. And you signed that affidavit after you had been retained as an expert for the plaintiffs in this litigation, correct?
A. I assume that May -- I don't know exactly the date that I was retained for this --
Q. Turn to page 911 of the article.
A. No, I want to -- because you brought up something that is important.
Q. I don't have a question pending, Doctor. I have --
A. Well, I have a response that I

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want to continue.
Q. Your counsel may ask you that.
A. Okay.
Q. Page 911. If you look at the top --
A. Page 911?
Q. Yeah, top left-hand column, first paragraph, third sentence.
A. I'm sorry, can you point it out for efficiency?
Q. Yes, sir.
You see in this article --
A. Yes.
Q. -- that you published in 2023, you said: Several hypothesized mechanisms have been proposed as contributing to these increases in time period and birth cohort effects, including social media, economic-related factors, changes to mental health screening and diagnosis, and the opioid epidemic.
Did I read that correctly?
A. That's correct.
Q. However, there was little -- and then you continue.

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A. Yes.
Q. However, there was little consensus across studies about the main driver of these trends, and studies lacked rigorous research design that would have enabled identification of causal effects of drivers.
Do you see that?
A. Yes, I see that.
Q. And what I read to you out of your own study is a truthful and accurate statement about the quality of the data, correct?
That's right?
A. Can you repeat your question?
Q. What I read from your study, those two statements --
A. Right.
Q. -- are truthful and accurate, correct?
A. They are not current.
Q. So your own paper now -- your paper in 2023 is wrong?
A. It's 2022 when it was submitted, and at the time, for example, it

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did not include my own 2024 research, and it did not include other research by Twenge and others.
So they support the evidence. They do not prove a causal link.
Q. But when you wrote this statement in this peer-reviewed publication, it was true and accurate, correct?
A. At the time, in 2022.
Q. And when you wrote that paper, right, this was before you got retained as a litigation expert for the plaintiffs' lawyers, right?
A. I -- I don't know when it was published in 2022. They -- or the sequence, I'm not sure, because I don't know when it was that I was retained for -- I might have been retained before this date. This is end of 2022.
Q. So you think you got retained before that publication got published?
A. I assume. Because I'm looking at the date, November 2022.
Q. So you think you were retained or might have been retained before this date

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that this was published?
A. I think I might have been retained, yes.
Q. Why don't you look at the conflict disclosure.
A. Yes.
Q. It says Declarations, right? There's a place where you have to declare whether you have a conflict of interest, right?
A. Right.
Q. It says: Conflict of interest. All authors have no competing interests to declare.
Do you see that?
A. Yeah, I see that.
Q. You didn't declare that you were working in some way, shape or form for plaintiffs' lawyers in social media litigation, did you?
A. I have not at this time, no.
Q. In your 2024 paper, you didn't declare that you had been retained by plaintiffs' counsel, did you?
A. This actually was brought to my

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attention, and I have since sent a letter to the editor to correct that. It's possible --
Q. Who brought that to your attention?
A. The counsel was -- looked at my paper and said that you have not disclosed this.
Q. And so the publication that's available to everybody publicly --
A. Yes.
Q. -- currently does not say that you have been retained as an expert consultant or an expert witness on behalf of plaintiffs' lawyers, true?
A. As I said, I have sent in a letter to the editor --
Q. The current available one doesn't say that, does it?
A. The one that is available online, no, it doesn't.
Q. When did you send the letter in?
A. When it was brought to my attention.
Q. When did you send the letter

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in? When? What month, what year?
A. I...
Q. 2024?
MS. EMMEL: Compound question.
BY MR. DAVIS:
Q. 2025? When did you send the letter in?
THE WITNESS: I'm sorry, I just -- you said something?
MS. EMMEL: I just objected as compound.
THE WITNESS: Oh. Compound question.
A. No, it was recent actually.
BY MR. DAVIS:
Q. How recent?
A. As it was brought to my attention.
Q. When?
A. In the past --
MS. EMMEL: Doctor, don't disclose privileged conversations.
BY MR. DAVIS:
Q. When did you send the letter in?

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A. I was told that I'm not supposed to disclose.
Q. I'm not asking what was discussed. I'm asking when you sent the letter in.
A. You could actually ask my counsel about --
Q. She's not telling you not to answer the question, Doctor.
Was it this year?
A. She's asking me not to disclose anything.
Q. She's not --
MS. EMMEL: We're out of time, I believe, with this deposition.
MR. DAVIS: No, we're not. No, no.
MS. EMMEL: Are we out of time?
MR. DAVIS: No, we're -- I'm getting -- we're closing the loop on this. I have a handful of questions, and then we'll reserve on the remainder.
BY MR. DAVIS:
Q. Dr. Mojtabai, I'm simply

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asking: Did you send the letter in this year to the editor?
A. It's within this year, yes.
Q. Okay. And you recognize now --
MS. EMMEL: You finished your question, Counsel. We're finished.
MR. DAVIS: I said I've got a handful of questions. I've got one or two left and I'm done.
MS. EMMEL: Well, we are out of time, I believe.
Are we out of time?
MR. DAVIS: No. I've asked Dr. Mojtabai several questions. You raised objections about the timing -- about whether there's some work product. I've got two questions left, okay? Two. If he answers them, I'm done, okay?
BY MR. DAVIS:
Q. Dr. Mojtabai, if you submit in any further article about social media use and any analysis of data for publication, you recognize that you have to declare a conflict of interest --

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A. I'm aware of that.
Q. -- because you're serving as an expert witness in litigation, correct?
A. That's correct.
Q. And when a conflict of interest is declared, it's letting readers know that an author has a bias, a potential bias, about how they view the data, right?
A. A potential bias, yes. It should be disclosed, I agree with you.
Q. Okay. And you only recently disclosed that --
A. It was brought to my attention, yes.
MR. DAVIS: Okay. I would ask for a copy of the letter that Dr. Mojtabai submitted to the journal, and I'm reserving on other questions on behalf of the defendants based upon good cause.
THE VIDEOGRAPHER: Want to go off?
MR. DAVIS: I don't know. Do you want to go off? Do you want to switch spots?

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MS. EMMEL: Yeah, let's go off for -- give us five minutes.
THE VIDEOGRAPHER: All right. We're off the record at 3:05 p.m. That's the end of Media 17.
(Recess taken, 3:05 p.m. to 3:08 p.m. CDT)
THE VIDEOGRAPHER: We're back on the record at 3:08 p.m. This is the beginning of Media 18.

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EXAMINATION

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BY MS. EMMEL:
Q. Hi, Dr. Mojtabai.
A. Hello.
Q. Are you able to go on for a little bit longer?
A. Sure. I have my coffee.
Q. All right. I am going to hand you what is being marked as Exhibit 63.
(Whereupon, Mojtabai-63, Curriculum Vitae, was marked for identification.)
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BY MS. EMMEL:
Q. That's your CV.
A. Uh-huh.
Q. Dr. Mojtabai, what is your education?
A. I have a medical degree. I'm trained as a psychiatrist, also as a clinical psychologist, and I have an MPH in public health and have done postdoc research fellowship.
Q. Thank you.
Do you recall questions yesterday about how you introduce yourself?
A. Yes, I do.
Q. How do you introduce yourself?
A. I introduce myself as a mental health and -- mental health researcher and a psychiatric epidemiologist.
Q. Does that include the application of biostatistics?
A. Indeed, it does.
Q. Describe the type of research you do.
A. I -- most of my research is focused on psychiatric epidemiology using

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survey or administrative data and drawing conclusions that are relevant for services or epidemiology from these data using the methods of biostatistics.

Q. And have you published epidemiological studies?

A. Yes, I have.

Q. Approximately how many studies have you published in epidemiology?

A. I would say at least 60 or 70 papers I've published can be categorized as psychiatric epidemiology. Some of them are specifically in journals of psychiatric epidemiology. Some of them are in journals of epidemiology or public health and other journals.

Q. Do you analyze the results of your studies using biostatistics?

A. I do.

Q. Do you -- do you design epidemiological studies?

A. I do.

Q. What types of studies in epidemiology have you designed?

A. Cross-sectional cohort studies,

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I have designed. I have also designed longitudinal studies with multiple waves of data as well as experimental studies.

Q. And have you been a reviewer for grants that include epidemiological studies?

A. I have.

Q. Are you an expert in the field of epidemiology?

MR. DAVIS: Object to form.

A. I would characterize myself as an expert in those two areas where I mentioned, mental health services and psychiatric epidemiology.

BY MS. EMMEL:

Q. Do you recall earlier that -- I believe it was yesterday, where you had stated that it is not the standard of research to say that X causes Y because it won't be accepted in the scientific community?

Do you recall that?

MR. DAVIS: Object to form.

A. I recall having said that, that's correct.

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BY MS. EMMEL:

Q. Can causation be determined between causal factors and mental health effects?

MR. DAVIS: Object to form.

A. It can be established using multiple methods -- types of methods, multiple types of data.

BY MS. EMMEL:

Q. And what is the process for that?

A. The process is usually conducting studies of different sort, cross-sectional, longitudinal, experimental, as well as meta-analytic reviews of all these data to -- and to put it all together to contribute to a causal understanding.

Q. And what factors into that type of an analysis?

A. There are different ways of looking at causation and different sets of criteria that may be used.

In my report, I use the Bradford Hill set of guidelines for establishing causation, and there are

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different elements of that. But that's not the only -- the only approach. There are more recent approaches.

Bradford Hill was published in the 1960s. It's still valid and still a very solid way of approaching causal questions, but that's not the only one.

Q. And when you have all of the evidence available, would you use any of those components independently to reach conclusions on causation?

MR. DAVIS: Object to form.

A. If you're talking about the Bradford Hill, for example, as an example of an approach to causal questions, it's -- it is based on the aggregate of data, the aggregate of -- or looking at all these different guidelines, consistency of associations, plausibility, biological plausibility, analogy, experimental data. They all contribute.

And it's, like, looking at the same problem from different angles using different -- using different lenses.

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BY MS. EMMEL:
Q. And the different pieces of your puzzle, to use your analogy, consists of different types of studies; is that correct?
MR. DAVIS: Object to form.
A. That's true.
Cross-sectional studies, they're not all the same. They have limitations. Each individual study, cross-sectional, longitudinal, experimental, has faults. But we do not discard them.
We consider them in looking at this, as you said, jigsaw puzzle, putting it all together. Some of them fit better, some of them don't fit well, but overall, it's the overall picture that's suggestive of a causal association.
MR. DAVIS: Object to the responsiveness after the word -- the answer "That's true."
BY MS. EMMEL:
Q. Would you ever use just one type of study to make a causal analysis?
A. No, I don't think that is even appropriate to just section out part of the

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data or evidence and based on the type of study and say this part of the evidence we're going to consider, and what is our causal conclusion based on this abstraction, based on this artificial selection of studies.
Q. In your analysis, did you consider all the evidence available?
A. I did.
Q. Do you recall being asked yesterday about whether cross-sectional studies can establish causation?
A. I do.
Q. What role do cross-sectional studies have in a causal analysis?
A. First I have to make --
MR. DAVIS: Excuse me.
Object to form.
A. No type of studies can establish causation. It is an aggregate that would tell us more likely than not one factor is the cause of the other. So that is the -- that's the standard we go by when we're looking at aggregate data.
And cross-sectional studies provide important information. We were

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talking about, for example, the dose-response relationship; that could come from causal -- from cross-sectional data. Bradford Hill never said that dose-response relationships have to come from longitudinal data.
So they contribute important information, and they can provide information about the plausibility of the association, the strength of the association, and some of them may suggest mechanisms, specific mechanisms that are talking to the specificity of the effect. That's one of the Bradford Hill criteria.
MR. DAVIS: Object to the responsiveness, move to strike.
BY MS. EMMEL:
Q. Did you also review internal defendants' documents?
A. I did. Not all of them at the same degree of attention as others.
Q. What role did those documents play in forming your causation opinions?
A. I considered them in forming my opinion, but I did not rely on them. My reliance was on empirical peer-reviewed

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publications.
Q. When looking at causal relationships in the area of mental disorders, is it common for the study designs to include questions on symptoms?
MR. DAVIS: Object to form.
A. That's actually the main way that we approach assessing outcomes in psychiatric epidemiology.
BY MS. EMMEL:
Q. And why is that?
A. Well, symptoms, scales, questionnaires provide standardized replicable data, and there is data showing that they are more reliable and valid than dichotomous diagnosis that might be derived or dichotomous outcomes measured.
And also, they're -- because they are standardized, because -- because they're replicable, they are immune to the vagaries of individual clinicians who might be doing the assessments, who might vary quite a bit based on their training or experience.
Q. Did you recall -- do you recall

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discussing the DSM yesterday?
A. Yes, I do. Yes.
Q. Is the DSM the only diagnostic tool you use as a clinician?
A. The DSM itself says that it shouldn't be, you know, the only -- the only diagnostic tool, as you said, and clinicians should use their judgment in their clinical work.
And there are other indexes of diagnosis, like, ICD, ICD-11 nowadays that are used also. And clinicians use, based on their clinical experience or interest, different measures or scales in their practices that might be helpful for their diagnosis and treatment of conditions.
MR. DAVIS: Object to the responsiveness, move to strike.
BY MS. EMMEL:
Q. Is it the only tool in assessing clinically relevant diagnoses and treatment of diseases?
A. I wouldn't say that it is the only, no. I wouldn't characterize it as the only tool.

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Q. Are all mental health conditions that receive treatment in the DSM?
A. Oh, definitely not. The large -- the large group of people who seek treatment every day in every clinical setting -- and this is borne by evidence -- might not carry a formal diagnosis in the DSM.
They are presenting for maybe minor conditions, conditions that do not meet the criteria for a mental disorder according to DSM, but there are still issues that require help and treatment because they cause disability and impairment in functioning.
MR. DAVIS: Object to the responsiveness, move to strike.
BY MS. EMMEL:
Q. Dr. Mojtabai, do you recall discussing the design of the observational studies that you reviewed earlier today with Mr. Davis?
A. It's -- it's vague in my memory. Can you remind me?
Q. Did the -- let me phrase it this way.

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Did the designs -- did the observational study designs of the majority of the studies looking at social media include time spent, nature of use and content?
MR. DAVIS: Object to the form.
A. They -- they do. Many of them include actual measures of time spent, as you said, and some of them, specific forms. But it's really not easy to separate these because time spent is linked to mechanisms that -- or algorithms that might hold the attention of the user, and they may be linked to content because some content is more absorbing, more engaging than some that is not.
So I think they're all related to each other.
MR. DAVIS: Object to the responsiveness.
Is it all right, an objection by one will cover all defendants? Is that fine with you?
MS. EMMEL: That's fine.
MR. DAVIS: Okay. I assume

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that that applies to the objections I've made?
MS. EMMEL: That's fine.
MR. DAVIS: Thank you.
BY MS. EMMEL:
Q. Did you include -- did you consider all of the factors that went into these types of studies when reaching your opinions?
MR. DAVIS: Object to the form.
A. I tried to include -- consider all those factors to the extent possible, to the extent the data allows me to do that.
BY MS. EMMEL:
Q. In addition, as we've discussed at length and stated in your report, many other studies found social media use was related to adverse mental health outcomes; is that right?
MR. DAVIS: Object to the form.
A. Can you repeat the question? I'm sorry.
BY MS. EMMEL:
Q. We were talking about observational studies.

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A. Yes.
Q. And in addition to those, other types of studies found that social media use was related to adverse mental health outcomes, correct?
A. Correct.
MR. DAVIS: Object to form.
I'm sorry, go ahead and answer.
A. Yes, experimental studies. Observational, of course, includes longitudinal and cross-sectional, and also ecological studies, but the experimental studies also support that.
BY MS. EMMEL:
Q. Would you agree that the mental health outcomes found in the majority of the studies were found regardless of the content the participants were viewing on the platforms?
MR. DAVIS: Object to the form, also leading.
A. Can you again rephrase your question?
BY MS. EMMEL:
Q. Were the -- were the majority

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of the studies -- were the majority of the results found in the studies regardless of content that the participants were viewing?
A. Yes.
MR. DAVIS: Object to the form and also leading.
A. I would say that a large proportion. I don't know what the proportion, what the number is, are based on the extent of use.
But as I said, extent of use is intimately related to the content, the engagement caused by the algorithms. So separating these is not easy, the content and the extent of use.
But most of the studies used length of use or time -- length of time the person is on the social media as a measure of exposure.
BY MS. EMMEL:
Q. What are some of the characteristics of social media platforms?
MR. DAVIS: Object to form.
A. So there are some commonalities among them. Do you want me to talk about

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those commonalities?
BY MS. EMMEL:
Q. Just in general, yes, please.
A. They provide very engaging -- especially the visual ones, the ones that are heavily visual, like Instagram, Snapchat, TikTok, they provide very engaging content for viewers.
And based on the responses of the viewers, which means lingering on some content or receiving likes or viewing more of that content, they -- the media do provide further -- further posts of that same content, which creates a continuous engagement of the person with the -- with the media and a flow state, in effect.
But it has been called a rabbit hole by somebody, some investigators. And that is one.
They also, by showing videos of other people or pictures of other people who might have doctored their videos, they are -- they contribute based on some research that I have also looked at, a sense of social comparison -- negative social comparison and

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fear of missing out.
So there are -- I think there are commonalities in algorithms across different media that encourage engagement by using those features.
MR. DAVIS: Object to the responsiveness, move to strike.
BY MS. EMMEL:
Q. Have you looked at what the most prevalently used social media platforms are by children and adolescents?
A. I have looked at the Pew report that actually reports on the different platforms, and I believe YouTube, Snapchat, TikTok, Instagram and Facebook are the most common. I'm not sure if that ranking is exactly accurate, but YouTube is, of course, at the top.
MR. DAVIS: Object to the responsiveness and move to strike after "I have looked at the Pew report."
BY MS. EMMEL:
Q. To your knowledge, do users use multiple platforms or single platforms?

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A. When you add up the percentage of viewers that are on these platforms, the average is above three. So on average, adolescents is on three of these platforms.

And more -- or about half, slightly more than half, report being constantly on one of these apps that I mentioned.

MR. DAVIS: Object to the responsiveness, move to strike.

BY MS. EMMEL:

Q. And as such, do all of those platforms use -- all of the platforms used affect their mental health outcomes?

MR. DAVIS: Object to the form.

A. So as I mentioned, the research is -- most of the research is based on social media as a group because children are on multiple platforms, and also because the features are very similar or similar -- I can't say they are exactly the same. They're similar across these platforms.

As such, the research has focused on the group of social media. There are individual studies that were brought up

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today for specific platforms, but most research is about all of them.

MR. DAVIS: Object to the responsiveness, move to strike.

BY MS. EMMEL:

Q. Dr. Mojtabai, could you take out your report, which is Exhibit 5.

A. Yes.

Q. And could you turn to page 1.

A. Yes.

Q. And look at where it says -- under Retainer, which is 2.1?

A. Yes.

Q. It says: I have been retained by counsel to prepare an expert report on what relationship there is, if any, between social media use and adverse mental health outcomes in adolescents and youth.

Is that correct?

A. That is correct.

Q. And have you done that?

A. To the best of my ability, I have.

Q. And then you -- as a matter of fact, you completed the report, this report,

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in response to that mandate; is that correct?

A. Correct.

Q. Now look at the top of the page under Summary of Opinions --

A. Yes.

Q. -- where you have got opinions 1 through 6?

A. Correct.

Q. Could you please read the first opinion?

A. Problematic social media use and social media addiction are substantial contributing causes of adverse mental health outcomes, including depressive and anxiety symptoms, body image disturbance, eating disorders, and suicidality, in children, adolescents, and young people.

Q. And as you sit here today, is that opinion still correct?

MR. DAVIS: Object to form.

A. It is my opinion still.

BY MS. EMMEL:

Q. And you stand by that opinion today, correct?

A. Correct.

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Q. And could you please read opinion number 2?

A. Children --

MR. DAVIS: Can I just have a standing objection to him just reading his report into the record? Because I don't think that's appropriate questions for direct -- a redirect.

MS. EMMEL: I'm asking him his opinions, and if anything has changed those opinions and if he stands by them.

MR. DAVIS: Can I just have a standing objection?

MS. EMMEL: You can have a standing objection, yes.

MR. DAVIS: Thank you. Thank you.

BY MS. EMMEL:

Q. Dr. Mojtabai, could you please read your second opinion on the first page?

A. Sure.

Children, adolescents, and young people are more vulnerable to problematic social media use and addiction

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than adults. Individuals with preexisting mental health problems are especially vulnerable to harms resulting from social media use.

Q. And as you sit here today, do you stand by that opinion?

A. I do.

Q. Could you please read your third opinion?

A. Multiple features built into the design of social media platforms are conducive to their excessive and problematic use by youth, and these features increase the risk of addictive use of the apps -- app and other adverse mental health outcomes. These include incentive salience, quote/unquote, and in parentheses, highly pleasurable stimuli such as searching "likes" or positive comments on the posts, the immersive nature of these media -- immersive is in quotes -- and the, quote/unquote, algorithmic nature of some of social media apps.

Q. And do you still hold that opinion?

A. I do.

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Q. And could you read number 4, please.

A. Both a greater degree of exposure to social media platforms and the nature of the use, for example, addictive use, social comparison, FOMO, contribute to the adverse mental health effects of social media in children and adolescents.

Q. Is that still your opinion?

A. Yes.

Q. Could you read number 5.

A. Problematic social media use causes adverse mental health outcomes in children and adolescents in part by fomenting negative social comparison and sleep problems.

Q. And is that still your opinion?

A. Yes.

Q. And read number 6, please.

A. Given the ubiquity of social media use and the large amount of time that youth spend on these media at the cost of other activities, the population burden of associated mental health problems is significant.

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Q. And do you still hold that opinion?

A. Yes.

Q. And did you use the totality of the evidence available to reach those opinions?

A. Yes, I did, the totality that was available to me.

MS. EMMEL: I don't have anything else.

MR. DAVIS: Why don't we take a two-minute, five-minute break, and we'll caucus to see how we can get this thing wrapped up.

THE VIDEOGRAPHER: Off the record at 3:34 p.m. That's the end of Media 18.

(Recess taken, 3:34 p.m. to 3:45 p.m. CDT)

THE VIDEOGRAPHER: We're back on the record at 3:45 p.m. It's the beginning of Media 19.

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EXAMINATION

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BY MR. DAVIS:

Q. Dr. Mojtabai, are you ready to continue?

A. Yes.

Q. All righty. Let me hand you what's been marked as Exhibit 64.

(Whereupon, Mojtabai-64, An integrative literature review of birth cohort and time period trends in adolescent depression in the United States, by Saiphoo et al, was marked for identification.)

BY MR. DAVIS:

Q. Do you see this is the Saiphoo and Vahedi meta-analysis that you cite in your expert report?

A. I do.

Q. Yes.

And if you look at the abstract --

A. Yes.

Q. -- you see that this -- it

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says -- oh, I'm sorry.
It says: This meta-analysis aimed to provide a quantitative review of cross-sectional research on this topic to provide clarification on the relationship between social media use and body image.
Do you see that?
A. I see that.
Q. Okay. And so this is a meta-analysis comprised entirely of cross-sectional studies, correct?
A. That is my understanding.
Q. And this is the study that you then used to conduct your own meta-analysis in your expert reports, correct?
A. That is correct.
Q. And so your meta-analysis that you did is entirely consisting of cross-sectional data, right?
A. That is correct because it's based on this.
Q. Okay. Now -- you can set that aside.
A. Okay.
Q. So let me just clarify.

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So the Saiphoo and Vahedi meta-analysis of cross-sectional studies doesn't establish the direction of the association, does it?
MS. EMMEL: Object to the questioning based on outside the scope of my direct.
A. I -- it does -- by itself it doesn't, no. It contributes. It's part of that puzzle that we were talking about.
BY MR. DAVIS:
Q. Right.
So it -- but it doesn't establish whether or not there's an association between use of social media that leads to body imaging concerns or whether body imaging concerns lead to more social media use, right?
MS. EMMEL: Object to the questioning as beyond the scope.
A. As such, yes.
BY MR. DAVIS:
Q. Okay.
A. You're correct.
Q. Okay. So let's turn to

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Section 5.7, where you deal with sleep disturbances at page -- at report -- at page 53.
A. You said 5 point what?
Q. It's Section 5.7, sleep disturbances.
A. Oh, in my report?
Q. Yes.
A. Oh, yes. And what was the page again? Sorry.
THE STENOGRAPHER: 53.
THE WITNESS: Oh, 53. No, it's -- oh, yeah, 52.
BY MR. DAVIS:
Q. In your report, you say that -- and I'm quoting you: Studies consistently show the negative impact of social media use on sleep quality and quantity.
Did I read that correctly?
MS. EMMEL: Object to the scope. Counsel, these are not within the purview of my direct.
MR. DAVIS: You just had him readopt his entire opinions in your questioning, and you asked him whether

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or not those are his opinions today.
You've opened up the entire floor for questioning about his entire report, so I just disagree.
MS. EMMEL: I'm going to object. A standing objection --
MR. DAVIS: Of course.
MS. EMMEL: -- to the line of questioning.
MR. DAVIS: Of course. We won't resolve that today.
THE WITNESS: Can you point me to the line?
BY MR. DAVIS:
Q. Sure, yeah.
It's the last paragraph of Section 5.7.
A. Last paragraph on page 53, yes.
Q. Do you want to hand it to me and I'll find it for you?
Yeah, it's the very last paragraph, first sentence.
A. Yes.
Q. Because what your Section 5.7 deals with is it deals with sleep

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disturbances and social media use, right?
A. Yes.
Q. And you end up -- you summarize a number of different studies on that issue, and you end with the statement that the studies, quote: Consistently show the negative impact of social media use on sleep quality and quantity.
Correct?
A. That is what I have written.
Q. Now, when you did your analysis of sleep quality and quantity or sleep disturbances, you didn't do a comprehensive analysis of all social media -- all studies involving social media use, did you?
A. It's not clear to me what you mean -- what you mean --
Q. You didn't find all -- when you did your analysis for the effect of social media use on sleep disturbances or sleep quality or sleep quantity, you didn't pull every study that had been done on the issue of social media use and sleep issues, did you?
MS. EMMEL: Objection, vague.

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A. I used some meta-analyses, and they draw on a large number of studies.
BY MR. DAVIS:
Q. Well, you -- go ahead. I'm sorry.
A. Clearly -- I mean, it's -- the total section is one page on sleep, and so it wouldn't include all -- it wouldn't be a comprehensive review of this literature.
Q. Maybe I can short-circuit this.
A. Okay.
Q. You don't hold an opinion to a reasonable degree of medical or scientific certainty that social media use causes or substantially contributes to sleep disorders, do you?
A. I hold the view to a certain -- to the degree of certainty that is more likely than not, it contributes to shortened period of sleep. It impacts sleep.
Now, does it lead to sleep disorders, because sleep disorders are very specific conditions. Does it sleep -- lead to sleep disorders is a different question.
Q. Okay. And I appreciate that,

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because I think that will short-circuit this.
But you haven't reached an opinion to a reasonable deal of medical or scientific certainty that use of social media causes or substantially contributes to any sleep disorder, right?
MS. EMMEL: Objection, vague.
A. Yeah, I think the section is clear, social media use causes sleep disturbance.
BY MR. DAVIS:
Q. Yeah, and that's what I'm getting at.
Your opinion is -- if I can kind of -- your opinion is that social media contributes to a shortened period of sleep, right?
A. That's correct.
Q. Okay. You don't hold the opinion to a reasonable degree of medical or scientific certainty that use of social media causes or substantially contributes to an actual sleep disorder, do you?
MS. EMMEL: Objection, vague.
A. To the extent that it

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contributes to sleep -- shortened sleep period and some studies also suggest quality of sleep, to that extent, some of these people in future might -- or currently might actually suffer from insomnia or a degree of sleep disorder that meets the clinical --
BY MR. DAVIS:
Q. None of the studies that you --
A. -- criteria.
Q. -- analyzed actually looked at social media use and the outcome measure of insomnia, true?
A. I'm looking at them to see. Sleep problems, sleep problems, sleep problems. Mostly they're looking at sleep problems, shortened duration of sleep and sleep problems.
Q. Okay. But there's no study that you've analyzed that assessed whether or not social media caused or contributed to actual insomnia, correct?
A. Not in this section, no.
Q. Okay. And there are other diagnosed and clinically recognized sleep disorders, correct?

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A. Correct.
Q. What are some of them?
A. Well, sleep apnea is one, and then -- so there is sleep terror. There is a number of -- the nightmare disorder in children, adolescents. So there are a number of sleep conditions.
Q. And you don't hold an opinion to a reasonable degree of medical certainty that social media use results in either sleep terror or sleep apnea, do you?
A. I haven't reviewed any evidence for that or seen the evidence when I was conducting this review.
Q. Okay. And you don't hold an opinion to a reasonable degree of medical or scientific certainty that use of social media causes or substantially contributes to some other diagnosed sleep disorder, do you?
MS. EMMEL: Objection, vague.
A. Can you repeat the question?
The question is --
BY MR. DAVIS:
Q. Right.
You don't hold an opinion --

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none of the studies that you looked at analyzed a sleep disorder outside of sleep apnea or sleep terror, right?
A. Uh-huh.
Q. Correct?
A. Yeah, there are two mentioned -- there are a number. There's a list of sleep disorders and --
Q. Right.
A. -- in excess --
Q. You're not offering an opinion in the case that social media causes or substantially contributes to some diagnosed sleep disorder, are you?
A. I'm not saying that in this report.
Q. Okay. You're saying that -- simply that your view is that use of social media can result in shortened duration of sleep, right?
A. And other sleep problems. Some of them are in the papers. We could look at them.
Q. Like what?
A. Well, we could look at the

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Viner study, for example, see what are the sleep problems. I didn't break it down. But we could look at some of those studies to see.
Q. Can you tell me -- give me the list of what sleep problems you --
A. Delayed -- delayed initiation of sleep is one they talk about.
Q. That's the same as shortened duration of sleep, right?
A. Well, delayed initiation might be related to social -- to shortened duration or not, but it's by itself a problem, a sleep problem.
Q. Any others? Delayed initiation of sleep and duration of sleep are two you've identified.
What else?
A. I'm looking at my report.
(Document review.)
A. Yeah, I have to look at the individual studies, if you want.
Inadequate sleep -- well, that's also related to that --
///

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BY MR. DAVIS:
Q. Okay.
A. -- to the shortened duration of sleep.
Q. And did any of the studies provide evidence that, regardless of whatever sleep problems you think may be a result of social media, that those then resulted in clinically significant symptoms that required treatment?
A. The requirement of treatment was not -- I mean, the studies don't look at mental health complaints that require -- do or do not require treatment.
Q. Okay.
A. They're usually looking at elevated scores on the scale, symptomatology that is increased.
Q. And none of those studies that you analyzed to assess social media use and sleep problems assessed or analyzed whether individuals had problems functioning during the day, right?
A. I believe at least some of the studies I looked at looked at the academic

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performance of children, and there was a relationship, mediation by sleep, so...
Q. Are you referring to the Chinese study that was a cross-sectional study?
A. Yeah. Yeah.
Q. Okay. Any others?
A. That one came to mind. There might be others. I don't recall any --
Q. You don't know of others today, do you?
A. Right now talking to you, no.
Q. Do you know of any of the studies that actually analyzed whether or not any sleep problems supposedly from social media impacted job performance or function -- day-to-day functionality?
A. The study that you have been mentioning, the Chinese one.
Q. Other than that, are you aware of one?
A. Off the top of my head, no.
Q. Okay. And it's also fair to say that -- is there any study besides the Viner study that was not cross-sectional?

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A. Again, this is a -- this is -- this is not the right page.
I don't recall, and I have to look at it to be able to tell you that.
MR. DAVIS: How much time do I have left?
THE VIDEOGRAPHER: Looks like you've got ten minutes.
MR. DAVIS: Okay. That's good enough.
Let's go off the record because I lost the place in my outline where I wanted to ask.
THE VIDEOGRAPHER: Off the record at 3:59 p.m. That's the end of Media 19.
(Recess taken, 3:59 p.m. to 4:00 p.m. CDT)
THE VIDEOGRAPHER: We're back on the record at 4:00 p.m. This is the beginning of Media 20.
BY MR. DAVIS:
Q. If you go to your report at page 13, Section 3.5.2.
A. Page 13, 3.5.2, yes.

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Q. If you look at the first paragraph, the last sentence, you say: Many adolescents depend on social media platform --
A. Can you --
Q. Sure.
A. This is page 13.
Q. Yeah. It's the last sentence here.
A. Okay. Thank you.
Q. Right there, okay?
You say in that paragraph, quote: Many adolescents depend on social media platforms to communicate and socialize with their peers or to fulfill academic requirements.
Correct?
A. Yes.
Q. Right.
So you recognize that there are a number of benefits to social media, correct?
A. It is used in beneficial ways by adolescents, yes.
Q. One of the beneficial ways is

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they communicate with friends and family, correct?
A. That's correct.
Q. One of the ways that they use social media is to educate themselves for schoolwork or for other news events that are happening around the world, right?
A. I'm not denying the benefits of social media. I'm talking about the harms in this report.
Q. Right. But let's focus on the benefits, okay.
What other benefits have you seen from social media --
MS. EMMEL: Objection, vague.
BY MR. DAVIS:
Q. -- in teens and young adults?
MS. EMMEL: Objection, vague.
A. There are, as you said, multiple benefits. Socializing, communicating. I talk about peer relationships. And some of the YouTubes are used educationally. It is useful. It has some very useful educational material.
///

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BY MR. DAVIS:
Q. Right.
Every social media platform, including all the defendants' social media platforms in this case provide educational benefits to teen and adolescents and young adults, right?
MS. EMMEL: Objection, foundation.
A. Again, I'm not denying the benefits for large group of adolescents and kids. And we talked about it. I don't advocate banning social media.
I'm just talking about some vulnerable kids who might be affected negatively and be harmed by social media.
BY MR. DAVIS:
Q. Right.
And you recognize that even patients who have serious psychiatric disorders, both -- who are both pediatric and adult patients, can benefit from social media, right?
MS. EMMEL: Objection, speculation.

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A. As you said, it -- "can" is a very large word, so they may benefit. They can benefit. And they can be harmed. They can be harmed by the content or the algorithms of the media.
BY MR. DAVIS:
Q. I got your views on harm. We've talked about them for two days.
A. Okay.
Q. I want to focus on benefits, okay?
You recognize that even pediatric and adult patients with serious psychiatric disorders or other medical conditions can receive significant benefits from the use of social media, right?
MS. EMMEL: Objection, speculation.
A. I haven't done this research. This wasn't part of my report, so to answer that question, I think, I have to do a similar survey or a report on -- which I'd be happy to do -- for positive effect of social media.
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BY MR. DAVIS:
Q. Well, you're not denying that even adult or pediatric patients with serious psychiatric disorders or other medical conditions can benefit from use of social media, right?
You're not denying that?
MS. EMMEL: Objection, speculation, asked and answered.
A. Yeah, it's an empirical question. I wouldn't speculate on that because I haven't done the review.
BY MR. DAVIS:
Q. You've published on that, Dr. Mojtabai.
A. I have published in the past in stating that --
Q. You have --
A. -- some people benefit from it.
Q. Let me give you Exhibit 66, which is your publication on that very issue.
(Whereupon, Mojtabai-66, Beyond Social Media: A Cross-Sectional Survey of Other Internet and Mobile Phone Applications in a Community, by Carras

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et al, was marked for identification.)
A. That is true. I have published on that. I don't --
BY MR. DAVIS:
Q. In fact, you wrote an article for the Practitioner's Corner right?
A. I didn't author that, but I might actually be in the list of the authors.
Q. Your name's on the article, right?
A. Can I see that?
Q. Right there. It's in front of you.
A. Oh, yeah, this one.
Q. Exhibit 66, your name's right on that article, correct?
A. Yeah, this is not -- it's not a journal's name. The journal is Journal of Psychiatric Practice.
Q. Let's just make sure the record is clear. You're a coauthor on an article about social media that appeared in the Practitioner's Corner for the Journal of Psychiatric Practice, right?
A. That is correct.

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Q. And what you did is you were analyzing and looking at Internet and mobile phone apps in a community of -- of -- a psychiatric community population, correct?
A. That is correct.
Q. And if you look at page 127.
A. Right.
Q. The left-hand -- the top left-hand corner you state in this article: Popular media applications have shown to benefit people with severe mental illness by facilitating communication and social support, helping patients cope with or manage symptoms, and providing a way to monitor or predict mental health states.
Did I read that correctly?
A. That is correct.
Q. That was true then and it's true today, right?
A. I don't --
MS. EMMEL: Objection, misstates testimony.
A. Yeah, I don't know if it is true today. It's seven years ago it was published.

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And I -- as I said, I haven't done a review of literature on that to be -- to have an updated current opinion on that to say if it's substantially beneficial or not.
BY MR. DAVIS:
Q. Let's see if I can get -- make sure I understand this correctly.
A. Okay.
Q. For the purposes of preparing your opinions in this case --
A. Right.
Q. -- you did not do an in-depth analysis to determine what the benefits of social media were, did you?
A. I was not doing a harm-benefit or benefit-harm -- cost.
Q. Right. But the plaintiffs' lawyers -- the plaintiff's lawyers only asked you to look at the harm side of the coin, correct?
A. They asked me if there is a causal relationship between harms that children and adolescents who use these media experience and whether the evidence supports -- "supports" does not establish a

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causal relationship.
Q. They didn't ask you -- the plaintiffs' lawyers didn't ask you to look at the benefits of social media and give a report and assessment of that, did they?
MS. EMMEL: Objection, asked and answered.
A. They -- it is explicitly stated in this report that -- what was the report doing.
BY MR. DAVIS:
Q. Correct.
And the plaintiffs' lawyers didn't ask you to assess and analyze the benefits of social media, did they?
A. Again, they didn't.
Q. Okay.
A. It's in the report, what I was told to do for --
Q. Look at page 128.
A. -- what they wanted me to look at.
Which one?
Q. 128.
A. This one?

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Q. Yeah.
Left-hand column, first full paragraph, line 6. You wrote in this article: Studies of social media use by people with SMI.
SMI is serious medical illness, right?
A. No, serious mental illness.
Q. Yes. Studies of social media use by people with serious mental illness indicate the benefits of seeking and providing support, developing new relationships and maintaining existing ones and seeking information about illness through online interactions about -- on social media platforms, message boards or chat applications.
Correct?
A. This is what is --
Q. That's what you wrote in this article?
A. Yes.
Q. And then you went on and say, a couple lines down from that, there's a sentence that begins "The value."

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Do you see that?
A. "The value." Okay.
Q. The value placed -- quote: The value placed on social networking by individuals with serious mental illness is high. In a recent review of the acceptability of mobile phone and online interventions by people with serious mental illness, individuals in several studies indicated a desire for social networking or peer support as part of the intervention.
Did I read that correctly?
A. That is correct.
Q. Right.
So what you're saying in this article is that individuals with serious mental illness are benefiting from social networking and that social media apps provide that benefit, right?
A. This paper was about social benefits of, as you said, networking social.
Q. So --
A. So the focus of this one was the benefit, not the harm.
Q. Okay. And then you come on --

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later on you say, on 129, right-hand column, first full paragraph, line 3.
A. Can you point to it?
Q. Okay. It's right here.
A. Okay. Thank you.
Q. You say: Whatever -- quote: Whatever through social interactions and connection or the productive and creative work of leveling video game characters or creating content on blogs or wikis, digital technology use may allow people with serious mental illness to communicate and connect, provide and receive support, and see clear evidence of success in a way that they may not in face-to-face interactions, quote.
That's what you wrote then, right?
A. Yes.
Q. And when you wrote that, you weren't serving as an expert for the plaintiffs' lawyers, were you?
A. That's 2018. No, I wasn't.
Q. And you also say -- and so the -- okay.
So one of the things, in fact,

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for this case, in order to educate yourself about something to do with the case, specifically the use of social media, you went on social media to learn about it, right?
A. I did.
Q. You went on a social media platform and said, hey, I'm going to educate myself about social media, right?
You did, right?
A. Yes, I did.
Q. And you went on the platform YouTube, right?
A. I did.
Q. And YouTube was helpful to you and it was beneficial to you, and you've learned information, right?
A. I did.
Q. You didn't have any mental --
MS. EMMEL: Excuse me. I believe our time is up; is that correct?
MR. DAVIS: Okay. I've got one more question.
MS. EMMEL: Our time is up,

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we're done.
MR. DAVIS: No, I've got one more question.
MS. EMMEL: That's fine, but the time is up so you can't ask the question because the time is up and the deposition is over.
MR. DAVIS: I don't think so.
BY MR. DAVIS:
Q. Dr. Mojtabai --
MS. EMMEL: Dr. Mojtabai, don't answer the question. The deposition is over.
MR. DAVIS: I have one more question. I have one more question.
MS. EMMEL: I'm sorry about that, but the time is up.
MR. DAVIS: I have one more question. Are you okay with that, Dr. Mojtabai?
MS. EMMEL: One more question, that's it.
BY MR. DAVIS:
Q. Dr. Mojtabai, you fully recognize that for every other defendants'

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platform in this case, YouTube, Meta, Snap and TikTok, they all provide helpful, beneficial information to people, adult or pediatric, that go on and use those platforms, right?

MS. EMMEL: Objection. The time is up on the deposition.

A. As I said, there are groups that are harmed by it, and many people benefit from it, including myself. I go on YouTube and I use the material there.

MR. DAVIS: Thank you, Dr. Mojtabai.

THE WITNESS: Thank you.

THE VIDEOGRAPHER: All right. Done? All right.

That concludes Dr. Mojtabai's deposition.

Snap --

MR. DAVIS: Yep. We're just going to -- something for the record. Defendants reserve on additional questions for the exchange of communications that we've had with plaintiffs' counsel.

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THE VIDEOGRAPHER: Snapchat used 30 minutes; YouTube used 28 minutes; TikTok used 10 hours, 16; Meta used 18; and Ms. Emmel used 26.

We're now off the record at 4:13 p.m. That's the end of Media 20.

(Time noted: 4:13 p.m. CDT)

--o0o--

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CERTIFICATE

I, MICHAEL E. MILLER, Fellow of the Academy of Professional Reporters, Registered Diplomate Reporter, Certified Realtime Reporter, Certified Court Reporter and Notary Public, do hereby certify that prior to the commencement of the examination, RAMIN MOJTABAI, MD, PhD, MPH was duly sworn by me to testify to the truth, the whole truth and nothing but the truth.

I DO FURTHER CERTIFY that the foregoing is a verbatim transcript of the testimony as taken stenographically by and before me at the time, place and on the date hereinbefore set forth, to the best of my ability.

I DO FURTHER CERTIFY that pursuant to FRCP Rule 30, signature of the witness was not requested by the witness or other party before the conclusion of the deposition.

I DO FURTHER CERTIFY that I am neither a relative nor employee nor attorney nor counsel of any of the parties to this action, and that I am neither a relative nor employee of such attorney or counsel, and that I am not financially interested in the action.

MICHAEL E. MILLER, FAPR, RDR, CRR
Fellow of the Academy of Professional Reporters
NCRA Registered Diplomate Reporter
NCRA Certified Realtime Reporter
LA Certified Court Reporter #27009

Dated: June 6, 2025

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INSTRUCTIONS TO WITNESS

Please read your deposition over carefully and make any necessary corrections. You should state the reason in the appropriate space on the errata sheet for any corrections that are made.

After doing so, please sign the errata sheet and date it.

You are signing same subject to the changes you have noted on the errata sheet, which will be attached to your deposition.

It is imperative that you return the original errata sheet to the deposing attorney within thirty (30) days of receipt of the deposition transcript by you. If you fail to do so, the deposition transcript may be deemed to be accurate and may be used in court.

ERRATA

PAGE LINE CHANGE

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ACKNOWLEDGMENT OF DEPONENT

I, RAMIN MOJTABAI, MD, PhD, MPH, do hereby certify that I have read the foregoing pages and that the same is a correct transcription of the answers given by me to the questions therein propounded, except for the corrections or changes in form or substance, if any, noted in the attached Errata Sheet.

_____

RAMIN MOJTABAI, MD, PhD, MPH DATE

Subscribed and sworn to before me this

_____ day of _____, 20 _____.

My commission expires: _____

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Notary Public



LAWYER'S NOTES

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